

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS

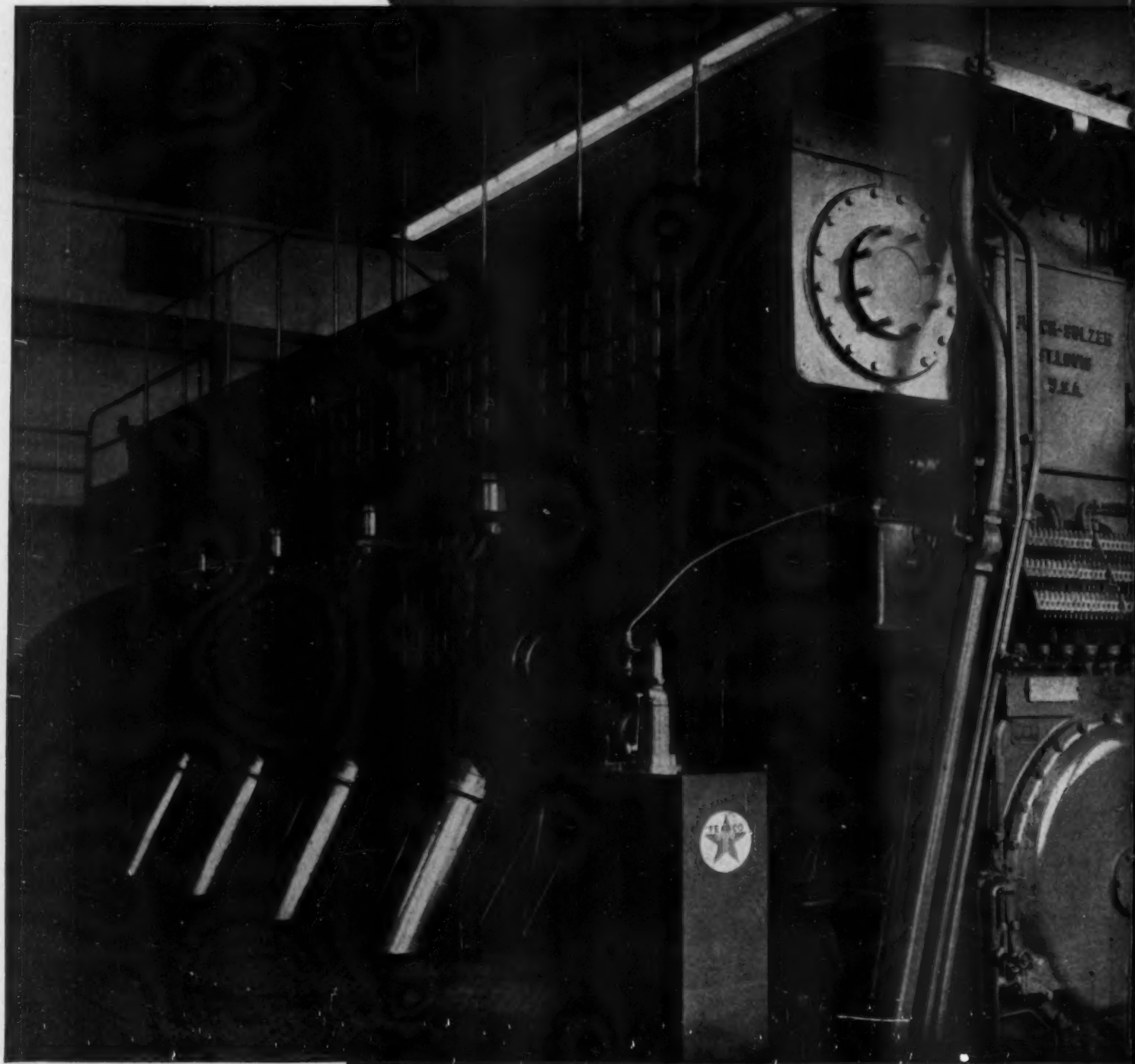


FIVE DOLLARS PER YEAR

DECEMBER, 1953

FIFTY CENTS PER COPY

HOW DIESEL



TUNE IN:
METROPOLITAN OPERA
radio broadcasts
every Saturday afternoon.
See newspaper for
time and station.



TEXACO

PLANTS CAN CUT FUEL CONSUMPTION

IMPORTANT among good maintenance practices is the use of a lubricating oil that is *exactly right* for your engines, whatever their type, size, speed, operating conditions, or fuel. This exactly-right oil is one of the famous *Texaco Ursa Oil* series — a *complete line* of lubricating oils for Diesel, gas and dual-fuel engines.

The *Texaco Ursa Oil* recommended for your engines will have outstanding resistance to oxidation and ability to assure clean operation. This means freedom from carbon, varnish and sludge . . . free rings for proper compression and combustion. Naturally, you'll get more power, use less fuel, reduce your maintenance costs.

The *Texaco Ursa Oil* series is approved by leading Diesel engine builders and is a favorite with operators everywhere.

Let a Texaco Lubrication Engineer help your plant set new records for efficiency and economy. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

URSA OILS

FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES



Chrome-Faced Cyclan Ring

high-strength

heat-treated

resilient

long-wearing

Cyclan

offers a combination of
advantages not found in any other
piston ring material

Sealed Power's new alloy for extreme operating conditions

Developed by Sealed Power metallurgists after years of experimenting and testing, Cyclan has strength approaching steel, resilience and life-expectancy exceeding cast iron, yet it retains the desirable bearing characteristics of cast iron. Cyclan has exceptional ability to retain these physical properties under extreme operating temperatures.

Cyclan piston rings are especially durable in super-charged engines. They have extraordinarily high impact value for shock resistance. Because of Cyclan's high resilient qualities, Cyclan rings retain their true shape even after considerable deflection.

Available now

Cyclan can be readily chrome plated, but it functions very efficiently without any plating.

Cyclan is available for original equipment piston rings in heavy duty engines. Some Sealed Power Cyclan Ring Sets are available for replacement now. Others will follow soon.



SEALED POWER
CORPORATION
MUSKOGON, MICHIGAN

Let our engineers tell you the Cyclan story!

Sealed Power

**PISTON RINGS · PISTONS
CYLINDER SLEEVES**

Right for the Job!

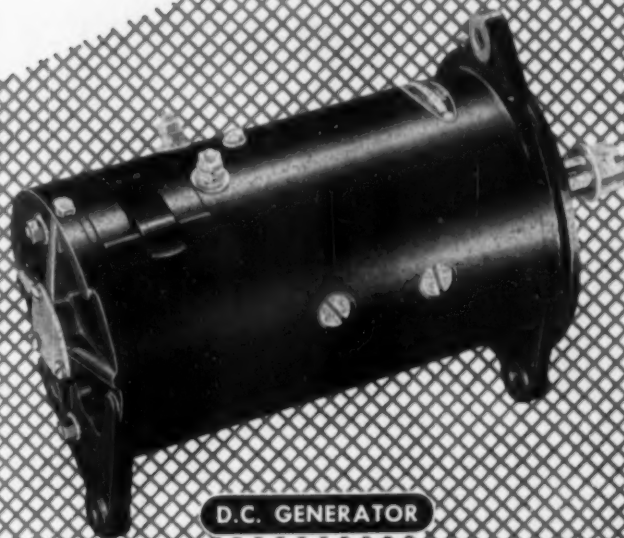


DELCO-REMY HEAVY-DUTY 5 $\frac{5}{8}$ " DIAMETER GENERATORS AND MATCHING REGULATORS

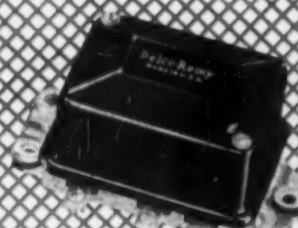
Delco-Remy heavy-duty 5 $\frac{5}{8}$ " diameter generators have made a name for themselves with Diesel users who need units that develop full output at low speeds on governed Diesel engines. These Delco-Remy generators have exceptionally long brush life (100,000 miles or more is common) and, because of durable construction and simple, dependable lubrication system, require minimum maintenance.

Heavy-duty features include an extra-heavy, rigid armature shaft, extra-large brushes and commutator, ball bearings in both commutator and drive end frames, wick-type lubrication with oilers, and forced ventilation of the entire unit.

These generators, with a frame diameter of 5 $\frac{5}{8}$ inches, are available in 6-, 12-, 24- and 32-volt models. Six-volt models have capacities as high as 55 amperes, 12-volt models as high as 50 amperes. The 24- and 32-volt models provide outputs of 20 and 15 amperes, respectively. Matching regulators are available for all models. Specify Delco-Remy heavy-duty generators with mounting brackets and pulleys when ordering new vehicles.



D.C. GENERATOR



REGULATOR

DELCO-REMY

Division, General Motors Corporation
Anderson, Indiana

WHEREVER WHEELS TURN OR PROPELLERS SPIN

5 Railroads cut costs with GM DIESEL-ELECTRIC DRIVE TUGS



These five railroads are cutting water transportation costs because their GM Diesel-Electric tugs with increased power, more maneuverability, add up to more work at less cost.

Towing car floats through heavy New York Harbor traffic, the GM Diesel-powered tugs can

make more round trips per shift because of their split-second engine control and high availability. They can run for 40 days without refueling and work 24 hours a day for the whole period. You, too, can reduce your water transportation costs by using GM Diesel-Electric tugs.

CLEVELAND DIESEL ENGINE DIVISION

GENERAL MOTORS • CLEVELAND 11, OHIO

ENGINES FROM 150 TO 3250 H.P.



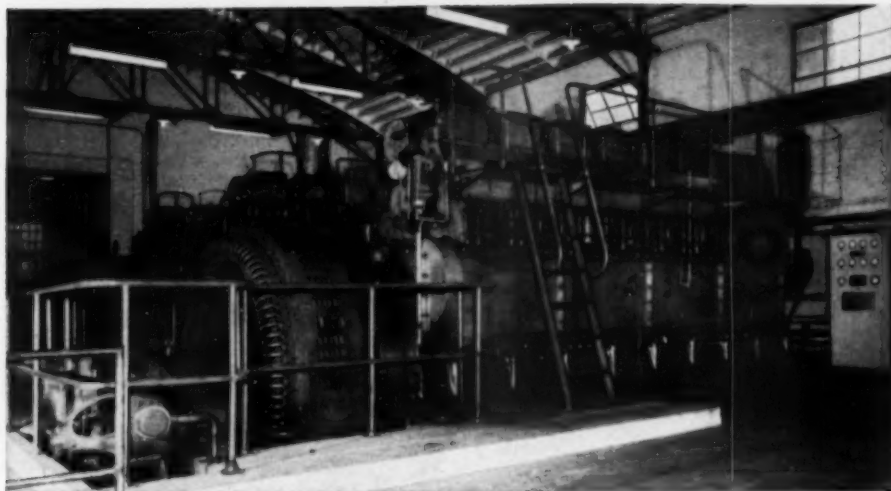
Tie Up to GM Service

Sales and Service Offices: Cambridge, Mass. • Chicago, Ill. • Miami, Fla. • New Orleans, La. • New York, N. Y. • Norfolk, Va. • Orange, Texas • San Francisco, Calif. • Seattle, Wash. • St. Louis, Mo. • Toronto, Ont. • Vancouver, B. C. • Washington, D. C. • Wilmington, Calif.



**50% longer service
over 200% better efficiency
and going strong**

... Koppers Piston Rings, Municipal Power Plant, Tarboro, N.C.



If you want proof that the installation of Koppers Piston Rings saves on lubricating oil, cuts down labor costs, makes for fuel oil savings...all at the same time...

then, read this!

In 1949, to increase the capacity of the Municipal Power Plant in Tarboro, North Carolina, three additional diesels were installed. The Operations report, previous to installing Koppers Piston Rings, showed that average lube oil consumption over a ten month period (the approximate life of the rings) was less than 700 HP hours per gallon.

After installing a complete set of Koppers Rings, the Operations report showed over 2500 HP hours per gallon. And after running under emergency conditions for 15 months, these rings are still going strong.

Here's just one more case where the installation of Koppers Piston Rings has improved engine performance. We can show you many more.

Tarboro not only saves in lubricating oil, but through the use of chrome rings is operating on #5 Diesel fuel oil without excessive wear. With original ring set, cylinder wear during an 8 month period totaled .035". With the Koppers ring set, cylinder wear during a 15 month period totaled only .010". . . 1/7 as much wear.

Does this suggest savings in operating and replacement costs to you? Then remember Koppers Piston Rings next time you have a diesel overhaul. First thing, investigate Koppers Conformable and Porous Chrome* Rings. And for special assistance with your specific piston ring problems, consult our technical staff.



**METAL PRODUCTS DIVISION • KOPPERS
COMPANY, INC. • Baltimore, Maryland**
This Koppers Division also supplies industry with
Fast's Couplings, Aeromaster Fans, Koppers
Electrostatic Precipitators and Gas Apparatus.
Engineered Products Sold with Service

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Industrial Piston Rings

KOPPERS COMPANY, INC., Piston Ring Dept., 1682 Hamburg Street, Baltimore 3, Md.
Gentlemen: Please send me full information on your Conformable Oil Ring.

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Company.....
Address.....
City..... Zone..... State.....



Koppers Porous Chrome*
Rings. Porous chrome surface holds and distributes oil during break-in. Seats quickly. This chrome prevents grit from embedding in ring surface. Prevents cylinder wall scratching. Reduces wear 50%. Last 4 times longer than other rings.



Koppers Conformable Ring maintains constant unit pressure for positive oil control. Conforms readily to meet cylinder distortion because flexible cast iron member is pressed outward by abutment type spring which exerts uniform radial pressure around entire circumference.

*Van der Horst Process



OPERATOR REPORTS

Production up — Maintenance down

Twenty of these Allison TORQMATIC-equipped trucks are working 21 hours a day hauling 34-ton pay loads of coal and overburden over 7 1/2% grades.

The Wadesville Production Company operates 20 Allison TORQMATIC-equipped Euclid rear-dump trucks hauling 42,000 tons daily in its strip mine near St. Claire, Pa. These trucks boost production by making round trips 25% faster than the mechanical-drive units they replaced.

This operator's records show TORQMATIC DRIVES outlast mechanical drives — maintenance time and costs are down too. At

routine overhaul periods, mechanics change out the TORQMATIC DRIVES in 2 hours less time than they change out a mechanical drive.

You, too, can cut your heavy-duty equipment operating costs by specifying Allison TORQMATIC DRIVES the next time you buy. Ask your equipment dealer, manufacturer or write:

ALLISON Division of GENERAL MOTORS
Box 894DD, Indianapolis 6, Indiana

ALLISON TORQMATIC DRIVES

*Unbeatable Team for Maximum
Operating Economy*

- *Quick-shifts at full throttle with fingertip hydraulic control.
- *Holds power to load at all times — no clutch pedal to push—no gearshift guess.
- *Cuts maintenance cost by absorbing shock — eliminates engine lugging — prolongs equipment life.
- *Only torque converter-transmission team designed to work as a unit and built by one manufacturer.

MATCHED UNITS BUILT BY ONE MANUFACTURER



Allison **TORQMATIC DRIVES**



COMPACT, EFFICIENT HYDRAULIC DRIVES FOR CRANES * TRUCKS * TRACTORS * SHOVELS * SCRAPERS * DRILLING RIGS

THE ENGINEER'S REPORT

DATA

PRODUCT *Chevron Starting Fluid*
UNITS *Passenger Buses*
CONDITIONS *Early morning starts—
Freezing temperatures*
APPLICATION *Spray into blower intakes*
FIRM *Salt Lake City Lines, Inc.,
Salt Lake City, Utah*

Late starts eliminated on 130-bus fleet!

IN 8 YEARS USING CHEVRON STARTING FLUID, Salt Lake City Lines has never had one of their 130 diesel buses leave behind schedule, even on coldest mornings. Before using Chevron Starting Fluid, several buses were late every winter morning. They needed booster batteries and at least one extra full-time man to start engines $\frac{1}{2}$ to 1 hour early; engines then idled until departure.

Savings in man-hours and batteries, plus end of fuel waste and engine wear due to idling, cut total operating and maintenance costs at least 2%, according to ONE SHORT SPRAY of fluid into spring cup on blower intake permits immediate starts. Chevron Starting Fluid is available in 1-pint cans and 7- and 17-oz gelatin capsules.



Mr. William Wilson, Superintendent of Maintenance. He says, "We wouldn't be without Chevron Starting Fluid...we couldn't operate with the staff we have."

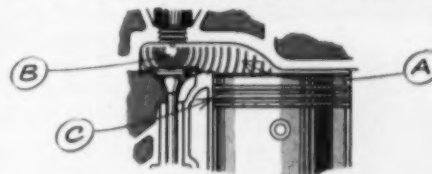


HOT
NEWS
COLD
ENGINES

FREE FOLDER gives you more facts on Chevron Starting Fluid—shows where it should be applied in different type engines. Write or ask for it today.



How CHEVRON Starting Fluid starts Gasoline and Diesel Engines instantly

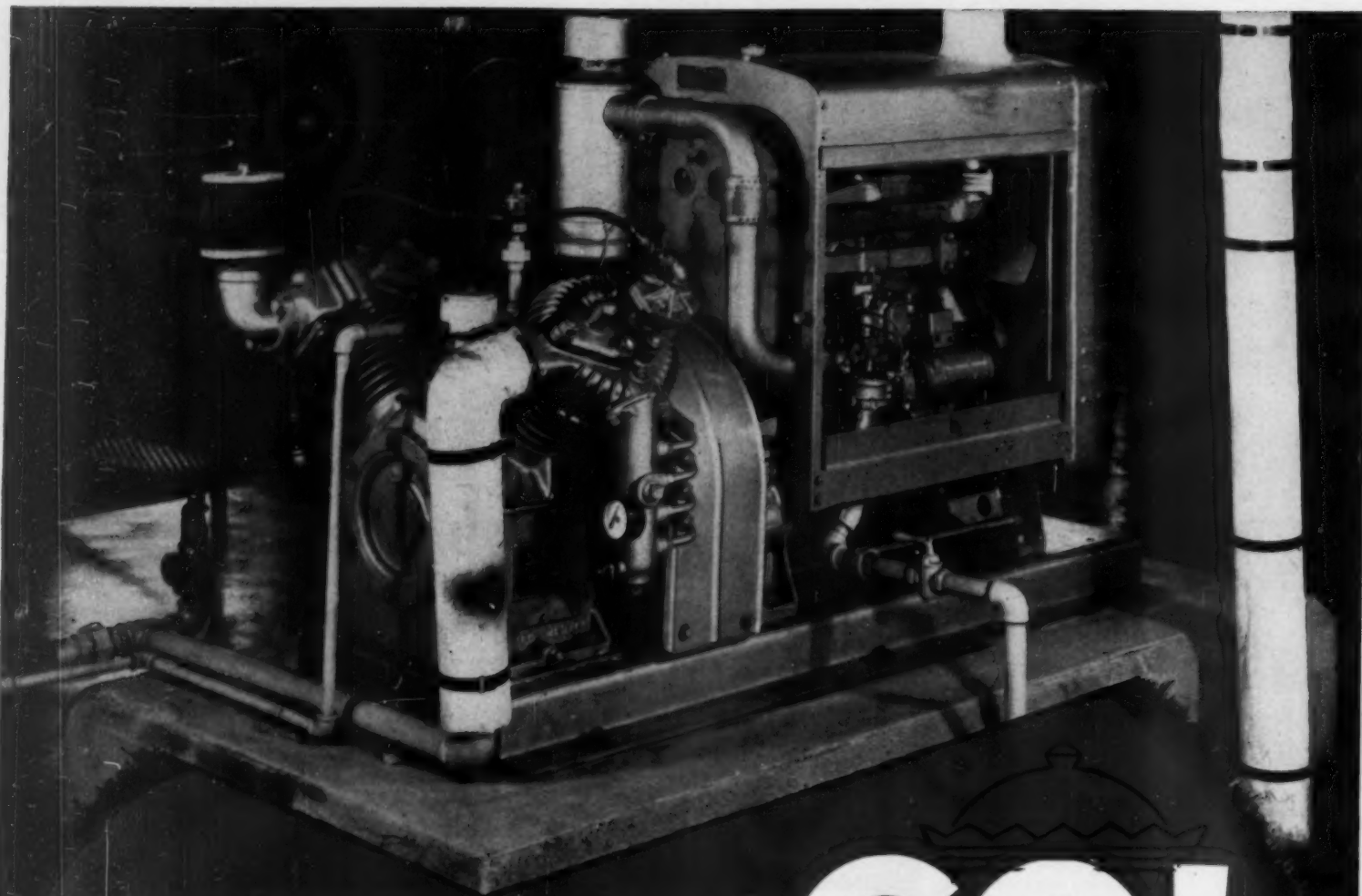


- A. Atomizes in lowest temperatures and provides powerful, easily ignited vapor in combustion chamber.
- B. Pressure, or the weakest spark, fires mixture—turns engine and heats air for regular fuel mixture.
- C. Contains lubricant and additives—inhibits cylinder wear and ice formation in primer equipment.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

TRADEMARK REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado



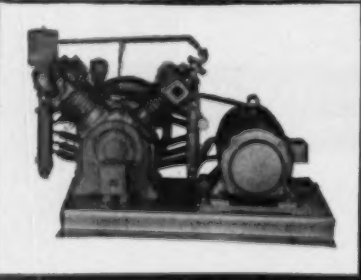
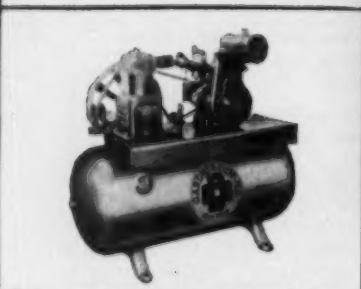
GET SET TO GO!

**-any time
-every time!**

... with "sure-fire" starting air
from one of these Gardner-Denver
Engine Starting Air Compressors.

You'll find a model to meet the
capacity and pressure requirements
of your diesel plant—regardless of size.

write today for bulletin ES-2.

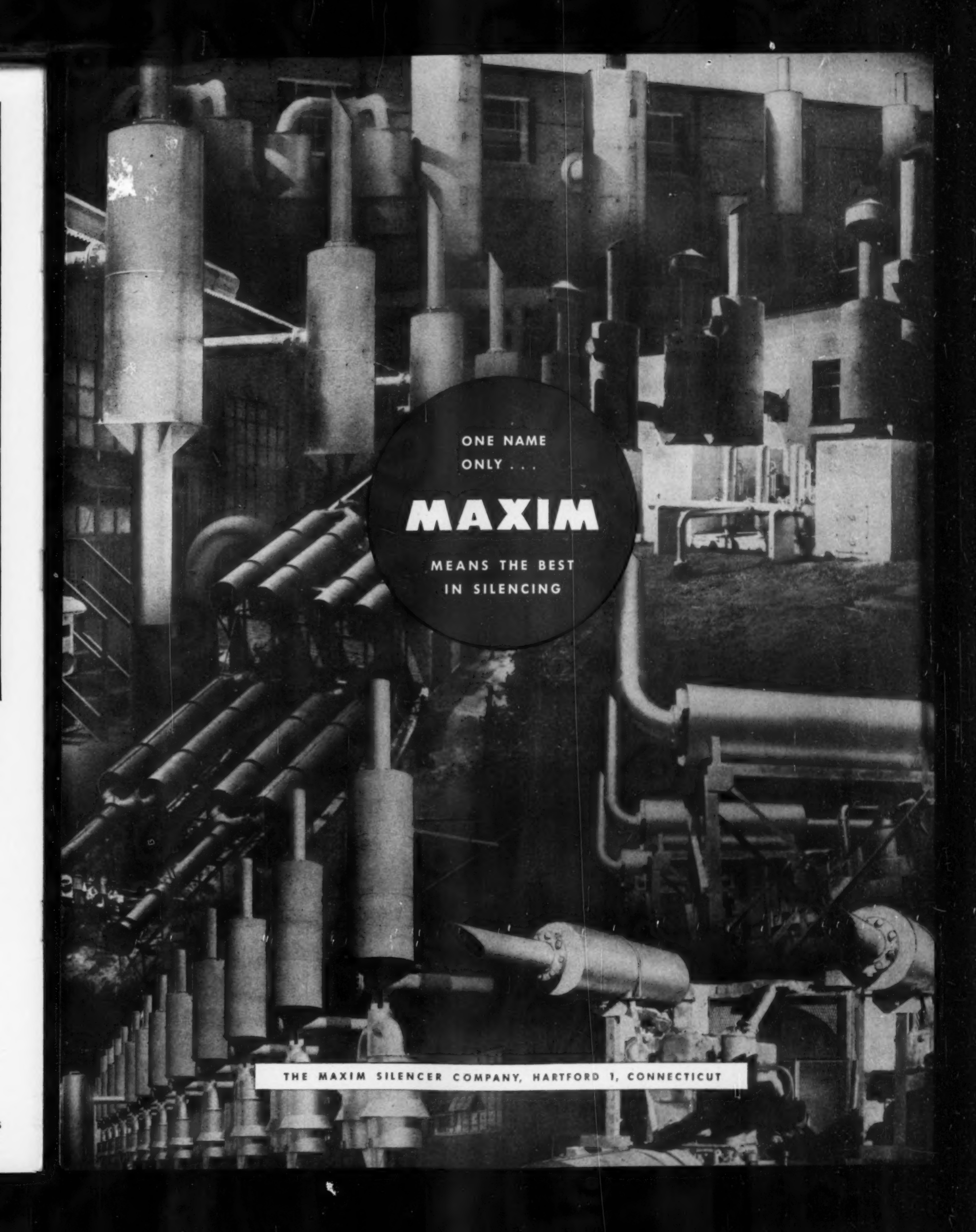


SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY



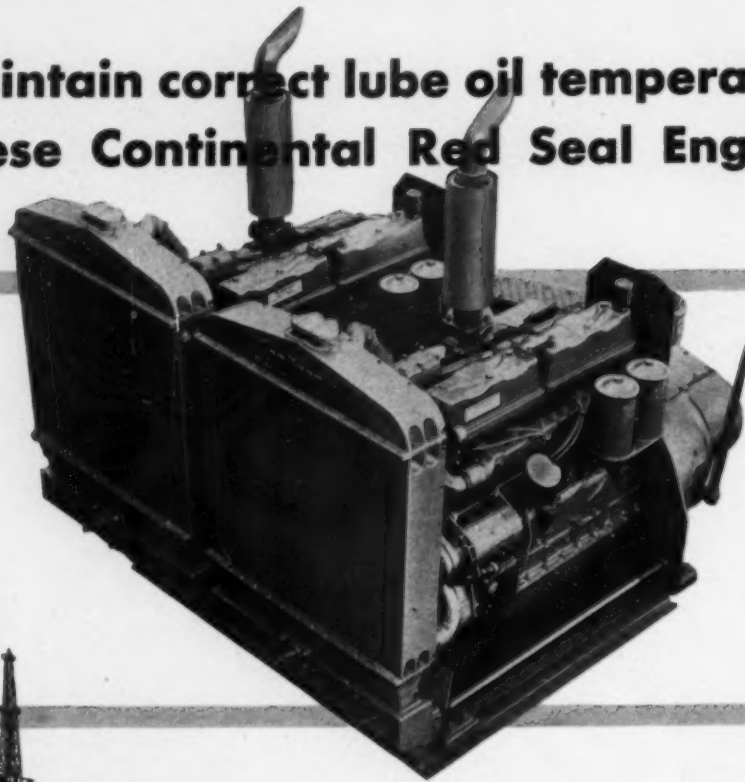
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ONLY . . .

MAXIM

MEANS THE BEST
IN SILENCING

THE MAXIM SILENCER COMPANY, HARTFORD 1, CONNECTICUT

**to maintain correct lube oil temperature
in these Continental Red Seal Engines**



ROSS EXCHANGERS

Furnished to power draw works or built to match the exact requirements of just about any oil field application — producing, distributing or processing — Continental Red Seal Engines are engineered "to do specific jobs supremely well".

For example: To provide close clearance parts with a free-flowing supply of properly cooled lube oil at all times, Continental Motors Corporation has equipped each of the Red Seal engines, shown above, with a Ross Type BCF Exchanger. Overheating is most dependably prevented!

Unequalled for thermal efficiency and proved ruggedness — Ross Exchangers are standard components of numerous types and makes of prime equipment . . . to cool lube oil, jacket water, torque converter fluid and hydraulic oil.

Completely pre-engineered and fully standardized, Ross Type BCF Exchangers are available with "off-the-shelf" promptness in answer to most requirements.

For complete information, request Bulletin 1.1K5.

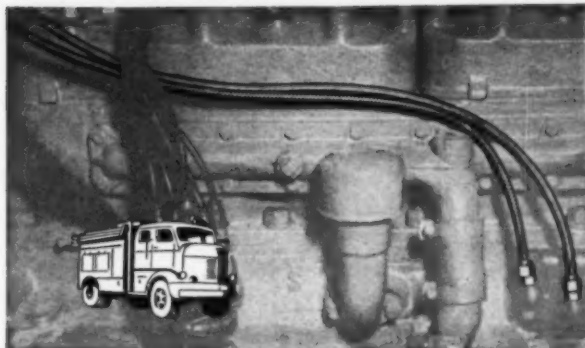
KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1425 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

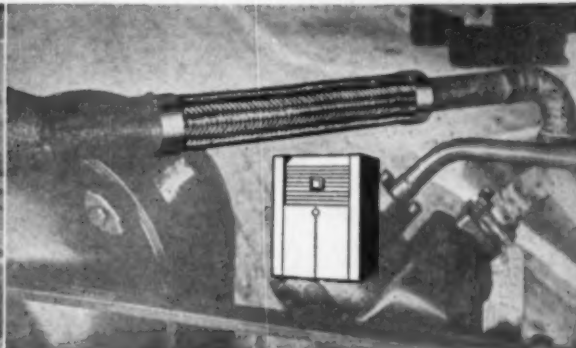


Serving home and industry: AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SHUREAM AIR CONDITIONERS

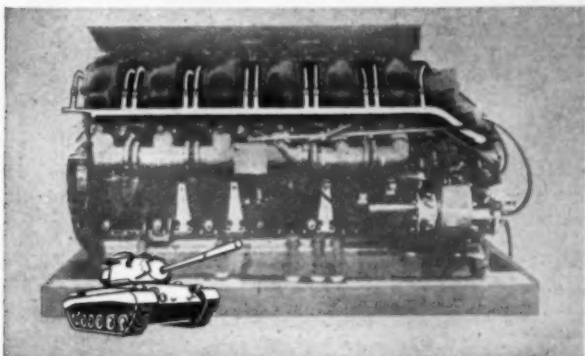
These 4 may end your design worries, too



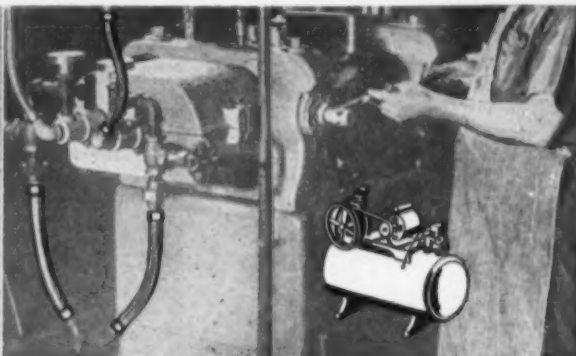
END FUEL LINE FAILURE. Four Wheel Drive's famous trucks stand up to roughest service. So do their Titeflex® oil and fuel lines. Automotive engineers specify Titeflex metal hose because it resists wear, vibration and corrosion—won't crack, bake or deteriorate under high engine temperatures.



ELIMINATE VIBRATION. To end vibration and prevent leaks around fittings, Uniflex seamless metal hose is installed between circulator coils and motor of GE's packaged air-conditioning unit. Made by Titeflex, Inc., Uniflex withstands critical stress and strain—is inherently leakproof.



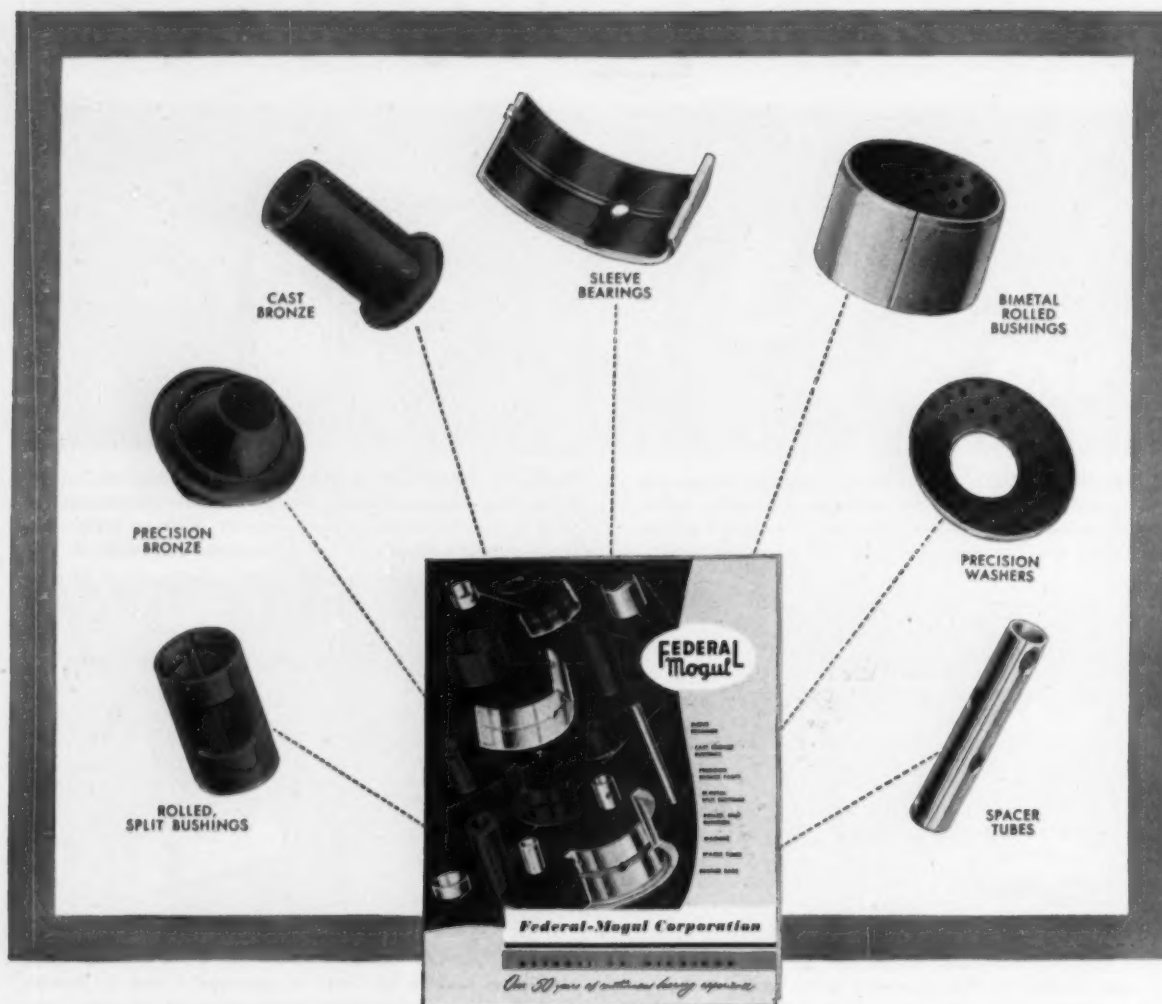
BANISH IGNITION TROUBLE. Neither mud nor dust, snow, water or lubricants can affect the Titeflex-protected ignition leads of Continental engines in Patton M-48 Tanks. Also suppresses radio interference. Titeflex is a leader in developing ignition harnesses and metal hose lines for Army Ordnance tanks and vehicles. Titeflex quality pays off here.



CONVEY CRITICAL FLUIDS SAFELY. Cooling lines to rubber milling machine use flexibility of Titeflex to advantage. In other applications, tough, corrosion-and-wear-resistant Titeflex safely conveys oil, steam, gases, lubricants, brine, acids, oxygen and compressed air. Rugged, seamless Uniflex withstands extreme vibration, physical abuse and strain.

THERE'S ALMOST NO END to the engineering uses for Titeflex® seamed flexible metal hose or Uniflex seamless metal hose. From aircraft to automotive equipment—from drain lines to dental units—Titeflex simplifies design, construction, operation and maintenance. For types of hose, fittings, assemblies, applications and engineering data, keep our new 48-page *Metal Hose Catalog No. 200* at your elbow. Use the coupon below to bring it and our design service without delay.

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This handy reference catalog on Sleeve Bearings and related products is yours

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Here is a wealth of helpful, descriptive information on all types of sleeve bearings . . . on bearing metals, precision bronze parts and washers and similar products. Complete information on sintered and special-process copper-lead bearings . . . on how bearing performance is obtained at bushing costs with bimetal bushings . . .

how costly seamless tubing or pipe can be replaced in many applications with low-cost spacer tubes. Condenses over 50 years' experience as specialists in sleeve bearings and related products. Your business letter-head request brings your *free* copy promptly. No obligation—write today!



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since

FEDERAL-MOGUL

1899

How *Gulf Dieselmotive Oil*
combats harmful engine deposits
to increase locomotive availability
and reduce maintenance costs:

- 1** Effective detergent action of Gulf Dieselmotive Oil prevents harmful piston ring belt deposits (has the right combination and the right concentration of the right additives).
- 2** The selected base stocks for Gulf Dieselmotive Oil insure against hard deposits on the piston crown and area above first ring.
- 3** The base stocks for Gulf Dieselmotive Oil are 100% solvent refined—this insures greater stability and better bearing protection.

Call in a Gulf Sales Engineer and ask him to recommend the proper grade of this quality lubricant to improve lubrication and reduce maintenance costs for your Diesel locomotives. Write, wire, or phone your nearest Gulf office today.



GULF OIL CORPORATION
GULF REFINING COMPANY
PITTSBURGH 30, PA.



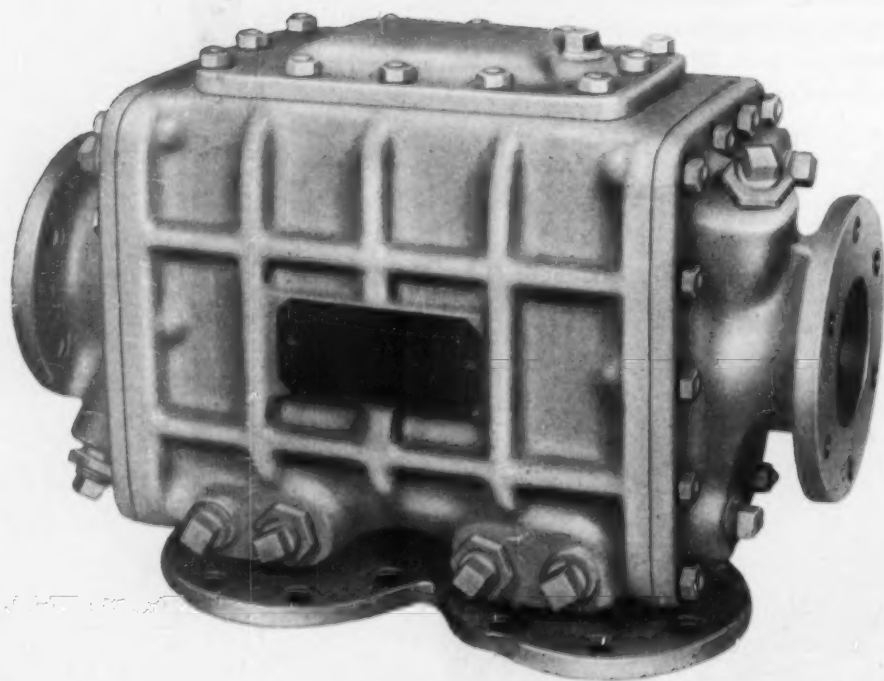
Harrison Heat Exchangers

Designed and Built for Dependable Service

When it comes to the important job of cooling lube oil and jacket water, more and more Diesel engine builders are specifying Harrison Heat Exchangers.

They know that they are efficient, compact and durable—that they insure dependable cooling at all times.

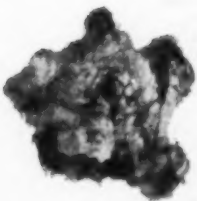
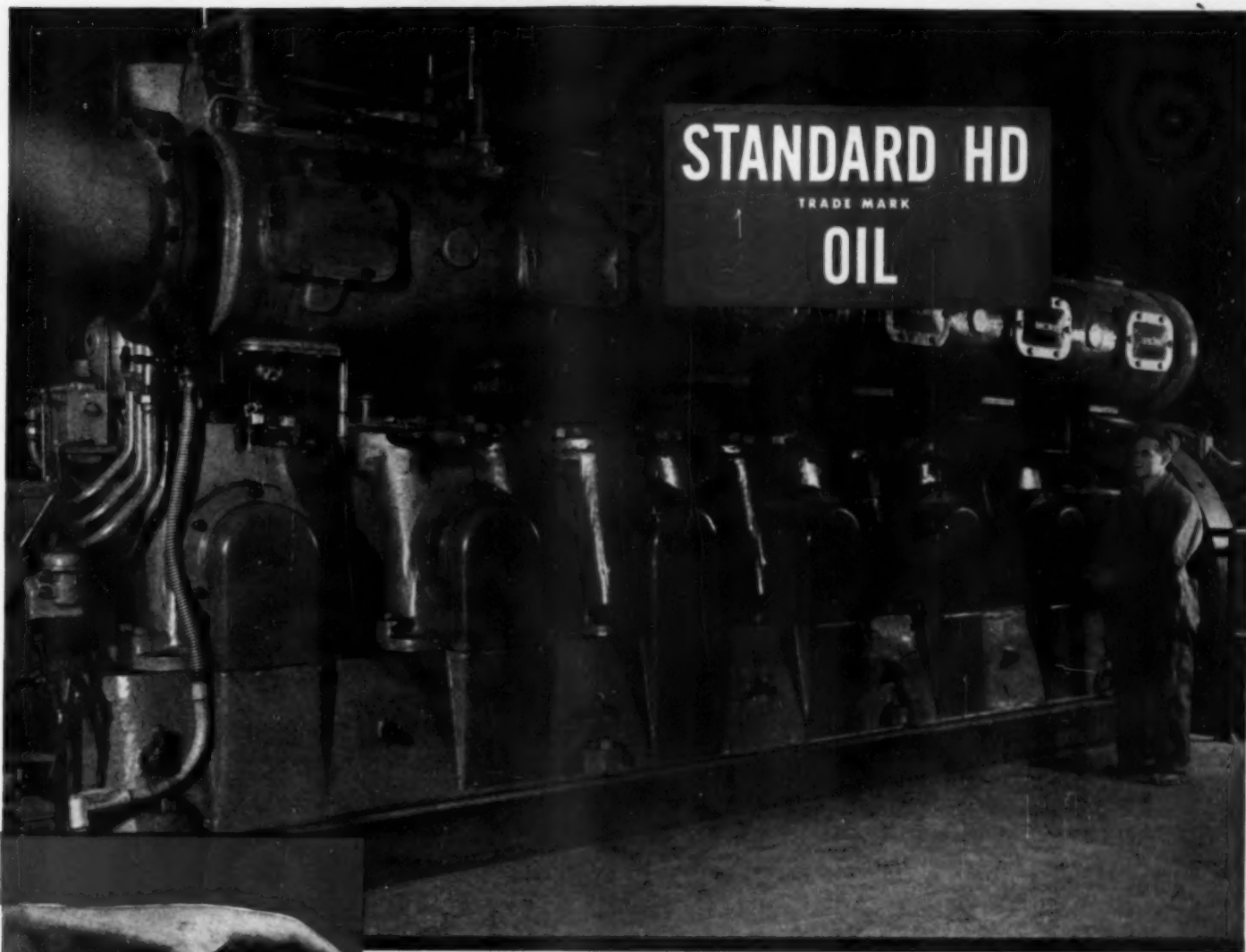
Harrison has been building heat transfer products for more than forty years. We believe our experience, skill and facilities can be of service to you.



HARRISON
RADIATOR
DIVISION

GENERAL MOTORS CORPORATION,
LOCKPORT, NEW YORK

HARRISON



They threw away the cleaning rags!

● When operators of this midwest power plant opened one of their three diesels for an inspection, they reached for their cleaning gear. The six cylinder engine, only two years in operation on an intermittent basis, was ridden with oil deposits from cylinder walls to crankcase. The lubricant used was a well-known product.

Operators took the advice of a Standard Oil lubrication specialist and switched their diesels to STANDARD HD Oil, a truly heavy-duty diesel lubricant.

Periodic analysis of oil samples showed that STANDARD HD maintained its high lubricating quality. Recently, after 5,000 hours'

operation on STANDARD HD, the six cylinder engine was opened, once again, for inspection. This time, operators found the engine in excellent condition and entirely clean.

Whether it's cleaner operation, less wear, or more efficient operation you are looking for; the Standard Oil lubrication specialist serving your area of the Midwest has the lubrication engineering ability and the outstanding diesel lubricant to help you reach your goal. You can reach this specialist, easily, by phoning your local Standard Oil Company office. Or, write: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY



(Indiana)

"Indian Lake" dredge, powered by 8 cylinder, 4-cycle Superior Diesel rated at 260 HP.



Suction Dredges powered by SUPERIOR DIESELS

Keep boat channels clear and build permanent land fill for Ohio's Division of Parks.

The development of Indian Lake recreational area at Russels Point, Ohio, required the removal of silt deposits to clear boat channels and overcome shoreline muddiness resulting from agitation of the silt.

In 1948 an American Steel suction dredge powered by a Superior Diesel was placed in service. Since that time the Superior Diesel has performed dependably and without interruption during thousands of hours of severe, continuous operation during each season, with negligible maintenance costs.

Park Manager Colvin comments, "The Superior has never given a minute's trouble—in fact, the performance of this unit led us to purchase another of the same model to power a new dredge for Portage Lakes."

The Portage Lakes dredge is now in operation—its task is to move more than a half million yards of silt to clear the lakes. The pump, driven by its supercharged 4-cycle Superior Diesel handles 1500 to 2000 yards each working day.

Captain Herbert Lewellin, who is in charge of dredge operations at Portage Lakes, says, "Our Superior engine



"Portage Lake" dredge powered by supercharged Superior Diesel developing 450 HP.

assures us dependable, fast starts and gives excellent performance under any load conditions. We have never had a bit of trouble with this power unit and I can also say that during my entire 37 years of dredging, I have never worked with an engine I like better."

That's the kind of service you can expect from Superior and Atlas Diesels regardless of the way you use them—for dredging, propulsion, power generation, or wherever else you need dependable engines. Write for full details on any kind of diesel engine application—there's a Superior or Atlas Diesel for every power need.



Distributor of *Listed* Diesels in the U.S.A.

ENGINE DIVISION
THE NATIONAL SUPPLY COMPANY
PLANT AND GENERAL OFFICES:
SPRINGFIELD, OHIO

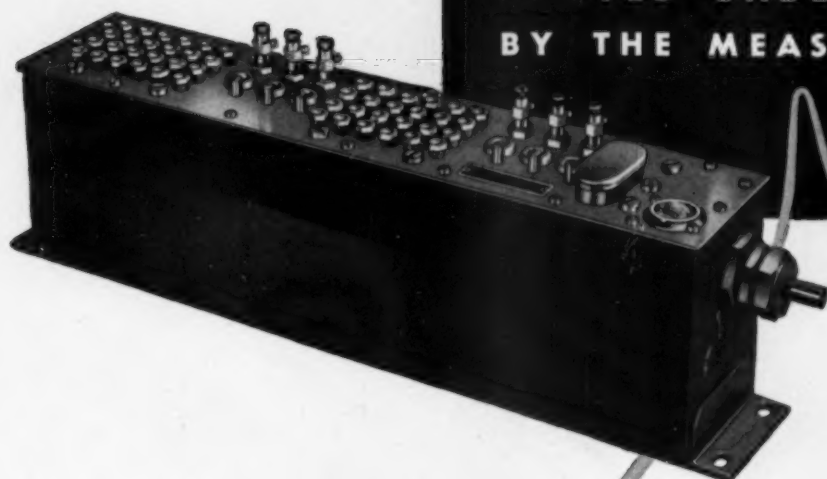
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MADISON-KIPP

Fresh Oil

FED UNDER PRESSURE
BY THE MEASURED DROP



the most dependable
method of lubrication
ever developed!

This lubricator becomes an integral part of a machine tool in which there are 48 vital bearings that require dependable lubrication. The

Madison-Kipp mechanism is so compact that the reservoir measurements are only 4" wide, 19 $\frac{3}{4}$ " long by 5 $\frac{3}{4}$ " high."

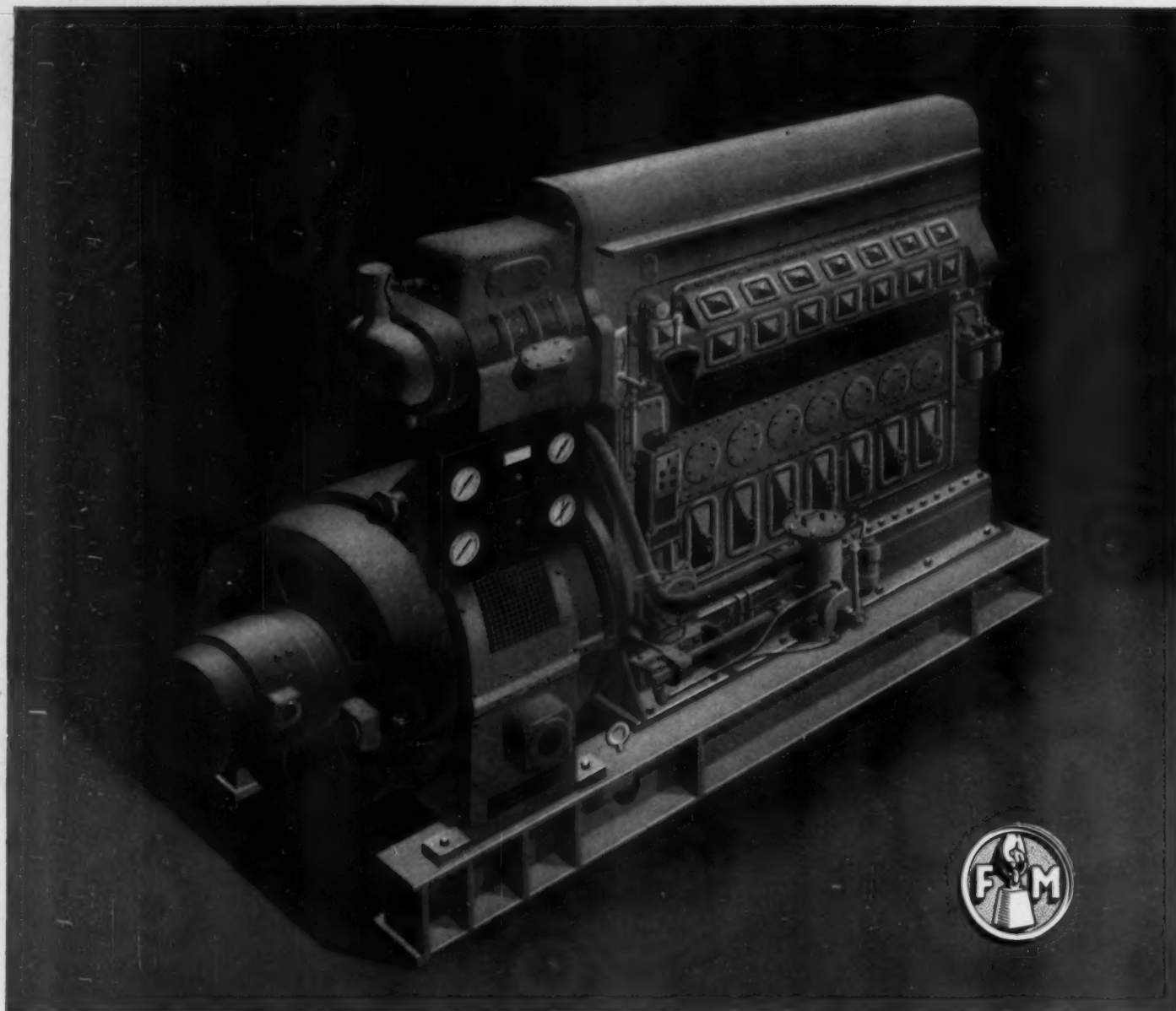
There are six different models to meet almost every application requirement. Please write us for all details regarding your particular lubricator requirements.

MADISON-KIPP CORPORATION

215 WAUBESA STREET • MADISON 10, WISCONSIN

kipp

• Skilled in Die Casting Mechanics • Experienced in Lubrication Engineering • Originators of Really High Speed Air Tools



The Fairbanks-Morse Opposed Piston Diesel Model 38F 5 1/4. 225 to 750 horsepower. Diesel, Dual Fuel and Spark-Ignition options. Other O-P engines available in horsepower ratings to 2400.

Some engines are not good enough

Yes, there are some diesels which just do not have what it takes for the job. They cannot satisfy the owner's pride in smooth, trouble-free operation and are lacking in the ability to square a balance sheet of operational costs and profits. For the more difficult jobs, many engines are simply not good enough.

Maybe you should pay more and get more!

If you want more engine-hours with fewer man-hours, *then* you should have the F-M Opposed Piston Diesel which will cost a little more and give you much, *much* more.

Fairbanks, Morse & Co., Chicago 5, Illinois.

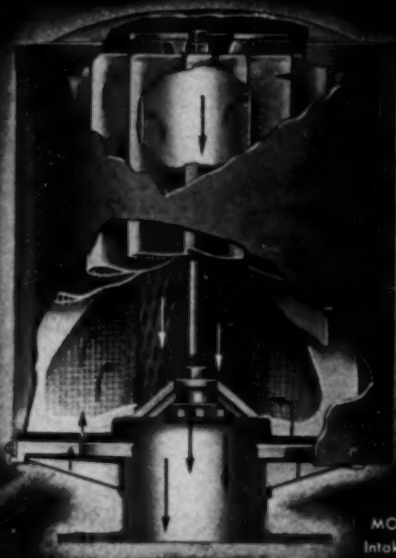


FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

YOUR EQUIPMENT
WILL LAST LONGER
with **STAYNEW**
INTAKE FILTERS!



MODEL D
Intake Filter

AND HERE'S WHY! Your equipment needs the protection Staynew Intake Filters are designed to give. Staynew Intake Filters stop the dust and dirt from entering through air intakes. Staynew's *Positive Protection* keeps shutdowns and repairs at an absolute minimum, actually lengthening equipment life. And Staynew itself requires less attention than ordinary intake filters, frequently operating two or more years *without maintenance*.

Write today for catalog S. I. F.



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ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED





Alcoa Aluminum Bearings Lower Diesel Maintenance

Aluminum bearings lower diesel maintenance because they're naturally corrosion-resistant, take condensate and acid oils in their stride. Solid bearing metal all the way through, their one-piece construction eliminates bond failure that causes down-time.

You're maintenance dollars ahead with aluminum bearings cast from a specially developed bearing alloy by Alcoa. These sound, high-quality castings are finished and sold by leading bearing manufacturers, used by the best builders of diesel engines. Aluminum Company of America, 1987-M Alcoa Building, Pittsburgh 19, Pennsylvania.



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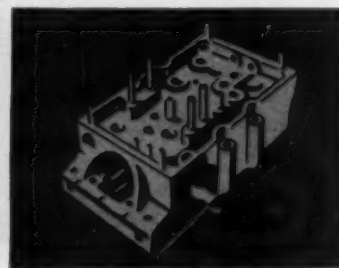


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Electric Company, showing interior and exterior
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Rx Dr. J. J. Madman

Editor—DIESEL PROGRESS





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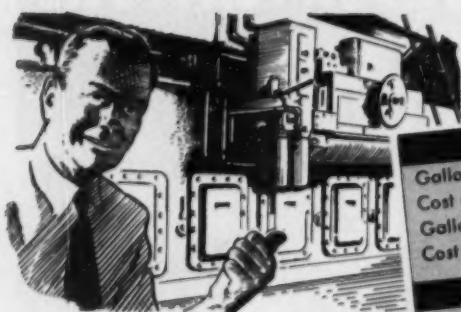
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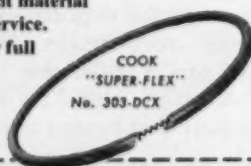


* Here is an actual case of how a municipal power plant cut operating costs with Cook "Job-Engineered" piston rings

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Cost for 5000 Hours	\$79,000	\$74,500	\$4,500
LUBE OIL			
Gallons per Hour	2.04	.98	1.06
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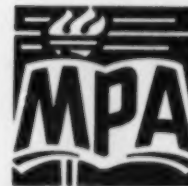


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FRONT COVER ILLUSTRATION

Diesel engine equipment speeds up logging for Fruit Growers Supply Co. and an International helps do the job with a Cummins 275 hp. diesel Fuller transmission. Enter 2110. (Photo courtesy of W. J. Lee & Marhan, San Francisco, California.)



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The top view shows diesel locomotive governor test equipment and an airplane propeller governor stand is shown below.



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DIESELS SPEED UP LOGGING

Dozens of Diesels Have Multiple Uses at Fruit Growers Supply Company for Producing Box Shook

By MARK OGDEN

WHEN there is need to perform heavy-duty work efficiently—with speed and low costs—dieselization naturally is the answer. For a demonstration of this fact, consider the logging operations of Fruit Growers Supply Company where dozens of diesels are utilized in a wide variety of applications. Fruit Growers Supply Company operates three sawmills in northern California for the production of box shook. The mills are located at Hilt, Susanville, and Westwood. In 1952, Fruit

Growers Supply was the sixth largest producer of lumber in the West.

Arrangements for a trip on one of Fruit Growers Supply's private, high-speed logging roads were made by James T. Nickell, assistant purchasing agent. He sat at his desk in Susanville, California, and talked by radio telephone with the youthful "Bull Whacker," Dan Johnson. The logging superintendent, was in his pick-up truck "out in the

woods," as lumbermen say. Communications are fast in the Fruit Growers Supply domain, and so are their logging roads and logging trucks. We followed the main logging road out of Susanville for 45 miles. It climbed in easy grades over Elk Mountain and past remote Eagle Lake, to the east of Mt. Lassen. Volcanic rock and ash are used in the construction of the smooth, well-kept logging roads of northeastern California. Designed and built with gentle curves and grades, and with plenty of visi-

Hilt Division of Fruit Growers Supply Company logs with 16 chain driven Sterling trucks using 200 hp. Cummins diesels. One here is dumping its logs at a reloading station in Yreka. Logs go from this point to the sawmill at Hilt by rail.

27





Washington trackloader uses 200 hp. Cummins with Twin Disc converter—Peterbilt engine is a 275 Cummins. Caterpillars are in the background.

Mack truck unloading at Westwood Pond uses 275 hp. Cummins, one of eight in this division. 5 Macks at Susanville use 300 hp. Cummins diesels.

Peterbilt here uses 275 hp. Cummins engine as do another 11 Peterbilts at Susanville while 13 more trucks of the same make all use 150 or 165 Cummins diesel engines. Thus the main logging road into Susanville—broad and smooth—is built for and maintained with dieselized equipment to speed up logging.





bility for safety. Fruit Growers' logging trucks can traverse the private highway at speeds of up to 50 miles per hour. Fruit Growers' men, roads, and equipment are so good that the 1953 logging season started early—in April. Four feet of snow was plowed off the logging roads, and work continued through the spring rains. They expect to keep rolling right up to Christmas time. Laterals off the main roads are generally good but not as wide as the arterial. Short stretches of roads near the constantly moving loaders, being roads only momentarily, are rough and deep in dust. They cause today's trucks and engines no particular trouble, but it is a cinch that only sturdily built machinery will hold together long in such rigorous service. Dieselized road-building machinery in use is primarily Caterpillar—tractors, scrapers, and graders. However, both Allis-Chalmers and Cummins diesel engines with Tourneau equipment also are found

on the job. As we passed Eagle Lake, a dieselized water wagon was pulling away from the shore where it had replenished its load and was again ready to sprinkle the highway. Plenty of sprinkler trucks are found in logging areas. They serve a dual purpose. Their regular job is to keep the dust down on the logging roads, thereby preserving surfaces. Their emergency job is fire-fighting.

Logs were being loaded on trucks by a dieselized Washington Trakloader, at the landing, or "side," we visited, using a 200 hp. diesel, operating through a Twin Disc torque converter. As the supply of logs in a given area is exhausted, the Trakloader moves easily and quickly to another landing. Unlike the cumbersome, tied-down steam machinery that has practically disappeared from logging, the Trakloader is typical of today's mobile, flexible and versatile dieselized equipment. It always keeps close

to the timber that is felled, trimmed and bucked by the woods crew. At this landing, the logs were being skidded within reach of the Trakloader by three Caterpillar tractors equipped with logging arches and winches. Activity at the landing reminded one of a fast-moving, well-organized construction job where every piece of equipment works on a cycle and meshes with the movement of all other equipment. There is little or no lost motion on the part of expensive equipment and personnel. At this landing, there was ample manpower and equipment to saw, load, and transport logs to the mill at a fast pace and do it safely.

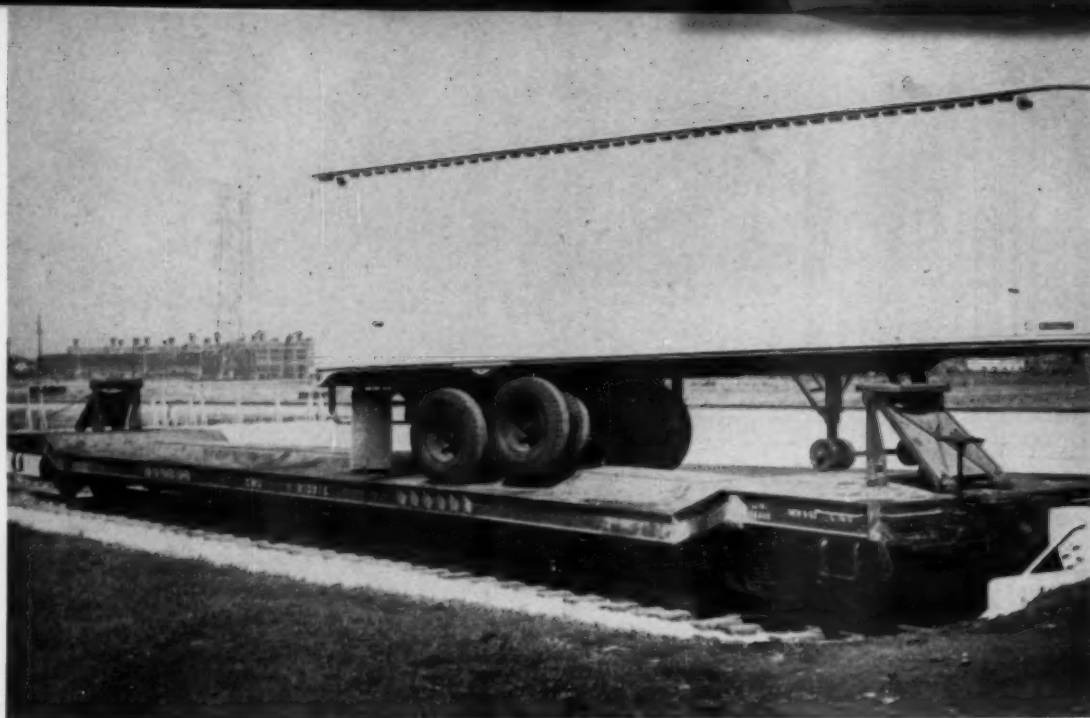
A "side rod" bosses the landing crew. A scaler measures and records the number of board feet in each load. The "top loader" and his two "hookers" load the trucks. "Knot bumpers" with axes and chain saws trim any branches that may have been inaccessible to the woods crew. A continual stream of "truck punchers" brought their Peterbilts to the landing and backed up to the Trakloader. As soon as a truck was loaded, another was on hand to back in. The schedule was such that there was no waiting by either the trucks or the Trakloader. This is partially accomplished by starting the trucks from the mill on a staggered schedule each morning. A total of 24 trucks using Cummins diesels were hauling logs to the Susanville mill. All but four of these belong to Fruit Growers Supply Company. The fleet consists of five Macks with 300 hp. diesels; 12 Peterbilts with 275 hp. diesels; and 13 Peterbilts with 150 or 165 hp. diesels. Purdy Brothers of Susanville are contract haulers. They own and operate two Peterbilts and employ two sub-haulers with International logging trucks. All four rigs use 275 hp. diesel engines. James A. Fain and Ward Zinnamond are the International owners. Some of the trucks were getting their logs at a second side which we did not visit. A Bucyrus-Erie shovel was loading trucks at this landing. Logs were being handled at the mill by a Link-Belt and an Osgood. All these are dieselized, and very efficient.

Three sides were providing logs for the Westwood mill. Loading was being done at these landings by dieselized Osgood, Bucyrus-Erie and Link-Belt shovels. Eight Mack and eight Peterbilt trucks, all using 275 hp. diesels, plus eight 200 hp. GMC trucks, were bringing in the logs. Average loads on the larger rigs were 15,000 board feet while the 200 hp. trucks were averaging 9,000 board feet. The Hilt Division, only a few miles from the Oregon state line, operates 16 chain-drive Sterling trucks powered by 200 hp. diesels. In addition, three older Sterling trucks, powered by 150 hp. engines, are used for water wagons. A large share of the logs for the Hilt mill are hauled into Yreka and reloaded on flatcars for transport to the mill by rail. Loading is done by means of A-frames and a diesel-powered Link-Belt crane decks the logs at the mill. Resident managers are: M. E. Barron, Susanville; Herman Baumann, Hilt; and Homer Vincent, Westwood. Although the three divisions are bound together by a strong thread of unity and company loyalty, each has a great deal of autonomy. For example, they purchase equipment in accordance with their experiences, needs, and beliefs. It is obvious they believe in moving logs fast with dependable diesel equipment for high production.



GENERAL Motors through its Electro-Motive Division has introduced a new plan of rail-highway coordination which would take thousands of truck trailers off the roads and put them on rails. Newly designed flatcars for hauling truck trailers, in the opinion of railroad men, will make it possible to haul trailers for 4¢ a mile less than the truckers can operate over the highways. Thus, railroads and trucking companies may merge freight movements into a reciprocal and cooperative joint venture that will eliminate many of the problems facing them now and bring new profits.

"The proposed new service culminates two years of intensive study and experimentation devoted to solving the mechanical problems involved in the successful movement of semi-trailers by rail," said N. C. Dezendorf, vice president of General Motors and general manager of Electro-Motive, during a recent demonstration of GM's new truck-trailer flatcar. With this new plan introduced by GM it only remains for the railroads and truckers to find



Loading trailer onto car from the side—note the recessed area for receiving the trailer wheels and the raised portion in the center of car to prevent side movement of the trailer. View at bottom of page shows 2 trailers loaded onto flatcar.

HIGHWAY SEMI-TRAILERS MOVE BY RAIL

**Electro-Motive Division of General Motors
Introduces a New Concept of Rail-Highway
Coordination**

By **BRUCE W. WADMAN**

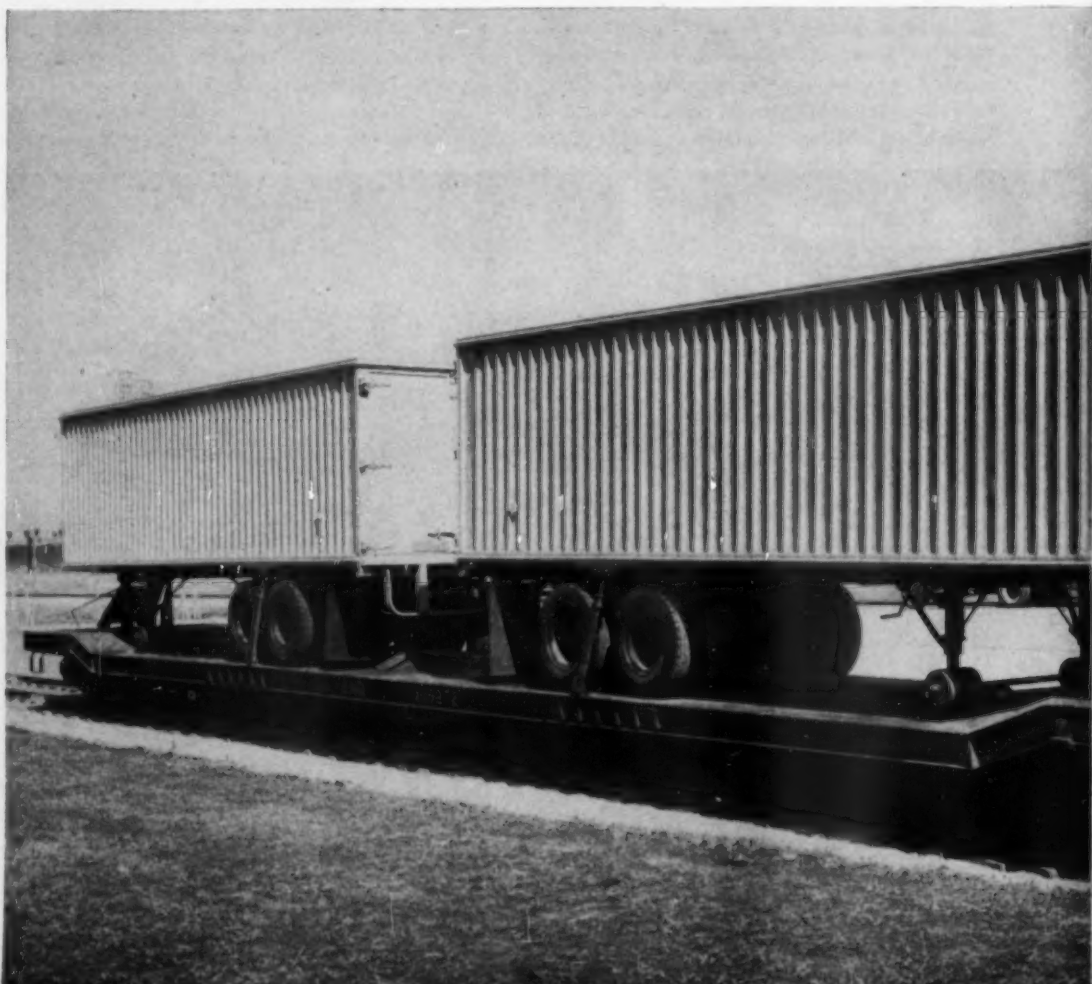
ground for overcoming traditional opposition of the two services and exploit the advantages that rail-highway-coordination holds for both. Tougher taxes and interstate commerce restrictions, high insurance rates and tight operating margins in general attract the truckers to any feasible plan to relieve their burden and up operating profits into a healthier realm. And the railroads are looking for new avenues of approach to ease the loss of profits in local freight movements—faster local freight and lower handling costs are strong attractions.

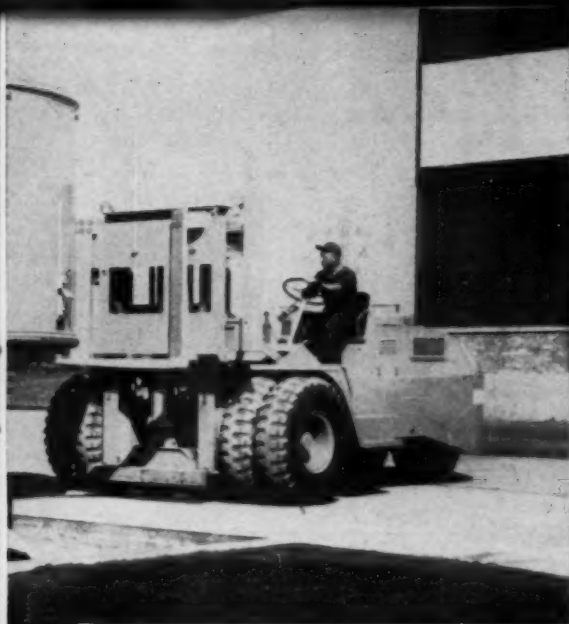
Out of the past is a fund of experience of both railroads and truckers in the movement of semi-trailers by rail but in all of this experience, both good and bad, operations were not of the order possible with the new type flatcar developed by General Motors.

Over-head clearance problems, loading methods and flatcar dimensions were all, more or less, obstacles to a really healthy and profitable coordination of rail and highway freight. But the new car is designed to remove these past problems and resolve the difficulties—profitably and to the advantage of both railroads and truckers. Pointing out that the basic idea of carrying highway trailers on railroad cars is not new, Mr. Dezendorf emphasized that the GM plan is "a new concept of that idea." Previous attempts utilized existing flatcars which can only carry one standard trailer. New cars designed to overcome the handicaps of present services will carry two trailers of a size up to the largest trailers in regular highway service.

Inter-city service of trailers on rails is under study now by Eastern roads—Pennsylvania; and New York Central; New York to Chicago and Chicago

to Detroit would be inter-city points. The New Haven has been operating profitably for years between New York and Boston; and Chicago & North



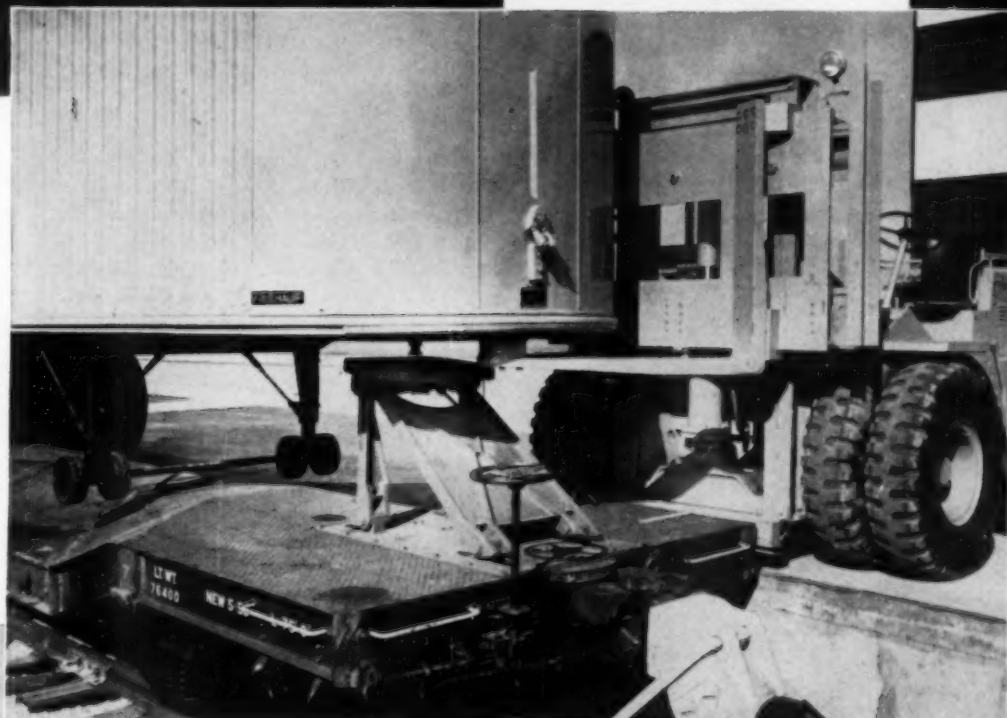


Western is a recent addition to rail-highway service. In addition to this activity, Rail-Trailer Company, headed up by Eugene F. Ryan, is negotiating contracts to rent railroads new type flatcars and operate terminals for them—terminals of proper design and location for the new service. Possibly, orders for as many as two thousand of the new cars would be placed at a cost of about \$28 million. This type of venture includes specially designed ter-

cars will be unloaded at another special terminal at the edge of town where the motor carrier's own tractors will pick up the trailers and deliver them to consignees. The plan is most feasible over inter-city routes of 300 miles or more and between cities generating sufficient traffic in each direction. It is believed such a system will enable the railroad to operate the service profitably and to charge a low enough rate to attract business in volume.

Trailer transport cars like this will take thousands of truck semi-trailers off main highways between cities and transport them by rail in General Motors' new plan.

Sway and slack is adjusted with struts in simulated stake holes on flatcar for additional tie-down security in transporting highway trailers by rail in GM Rail-Highway Program.



Clark Equipment Company Ross model 31,000 lb. capacity modified lift truck for loading and unloading trailers on new cars.

Ross lift truck sets kingpin of trailer in special slot in stanchion of trailer transport car.

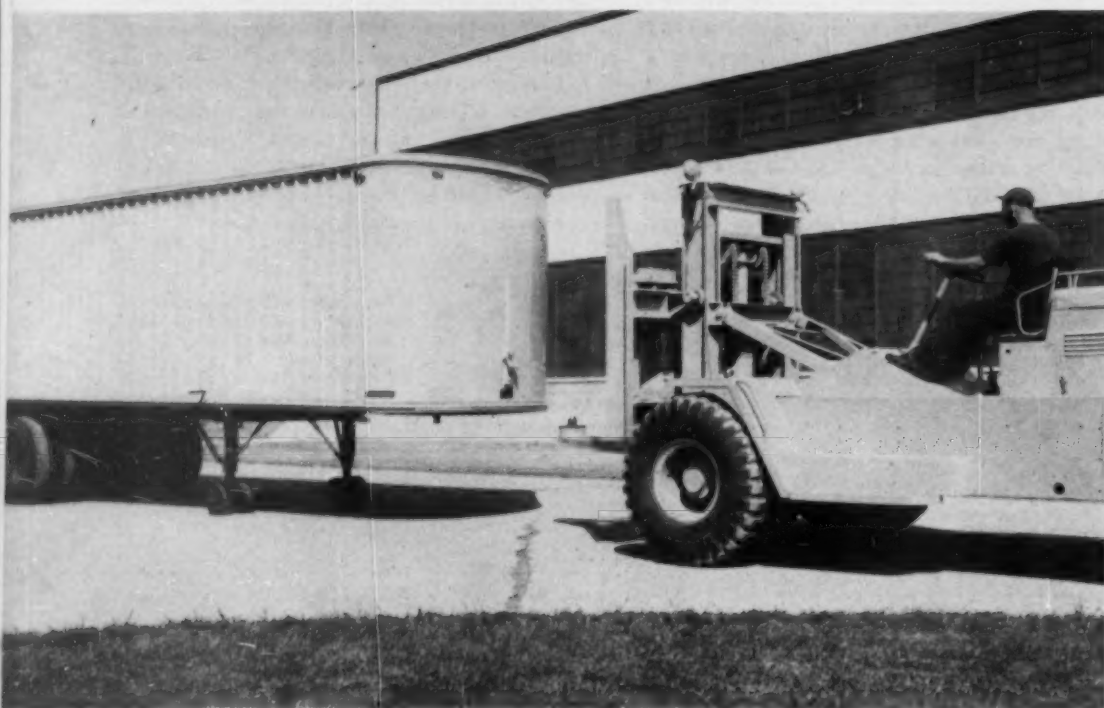


minals as well as the new flatcars so that handling of the trailers at strategic points will be expedited in the most efficient manner.

As pointed out by General Motors, the plan is intended to benefit the public by reducing traffic loads on main arterial highways and speeding the delivery of freight from door to door, to benefit the railroads by restoring substantial freight revenues and to improve the financial position of the motor carriers, many of whom are finding it difficult to make ends meet under present conditions. Thus, motor carriers will pick up cargoes at shipper's docks, or assemble trailer loads in their own terminals, and then deliver the loaded trailers to a new type rail loading dock at the edge of the city. At this dock, special loading devices will side-load the trailers on special trailer transport cars, each car carrying two loaded trailers. At the destination city,

Electro-Motive engineers have designed a well-type railroad car, 75 feet in length, equipped with a stanchion, embodying a sort of fifth-wheel arrangement, installed at each end of the car to engage the kingpin of the semi-trailer. This stanchion is equipped with a rubber shock absorber permitting movement of the trailer 4½ inches in each direction longitudinally, thus reducing shock caused by slack action of a train. Specially designed adjustable struts, attached to the trailer body near the rear wheels and to the side of the trailer transport car, provide additional tie-down security. Speedy side-loading and unloading of the cars at terminals is done with a large modified lift-truck.

In development of the plan, General Motors' people have recognized from the beginning that final success is dependent upon the satisfaction of three fundamental principles. First is the design

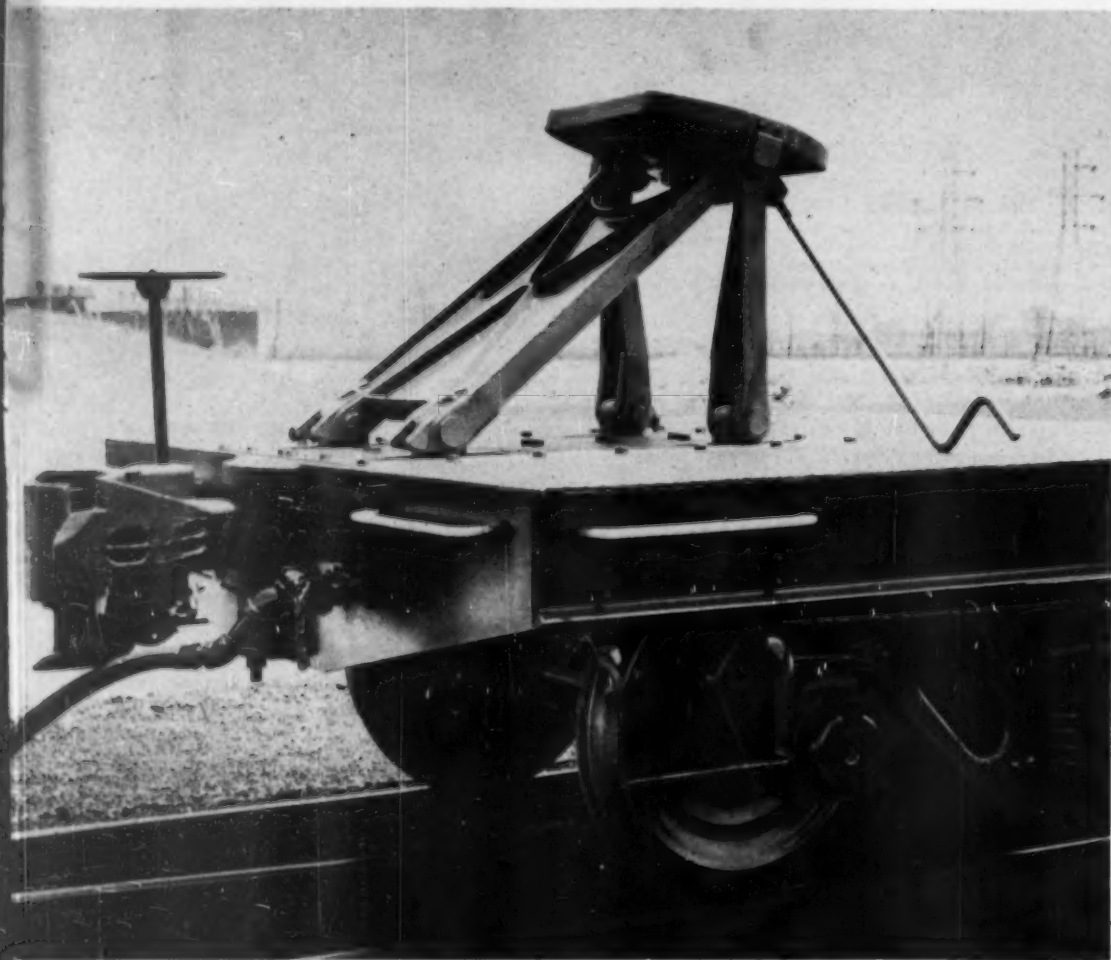


Ross modified lift truck about to engage pin on lift of carriage with hole drilled in towing plate of semi-trailer before loading onto car.

of equipment that will handle TWO standard highway semi-trailers per car. GM's transport car, which meets the standard clearance diagram on all railroads, satisfactorily answers that problem. Second, establishment of schedules that will equal or

better the motor carrier's over-the-road time. Third, establishment of rates low enough to attract widest possible use of the service by motor carriers, in other words, lower than trucker's present costs of hauling over the highway. To assure time schedules

Trailers loaded onto GM transport cars can move up to 4½ inches at either end with the support of these stanchions which are equipped with rubber shock absorbers to take up slack.



that will equal and in many cases better the highway time of motor carriers between cities, GM proposes construction of special terminals at the edge of metropolitan areas. These terminals, by-passing main freight classification yard, will feature depressed tracks or elevated platforms to bring the top of the trailer transport car to the level of the loading area. Speedy side loading and unloading of trailer transport cars in these special terminals will assist the railroads in cutting costs of the service and, along with the double pay-load provided by the increased capacity of the trailer transport car, enable the railroads to establish a rate that will equal or better the over-the-road costs of the motor carrier.

During the demonstration at the Electro-Motive plant, two 33-foot highway semi-trailers were loaded onto the trailer transport car from a specially designed loading area with a depressed track. The trailers were maneuvered with ease both onto and off of the rail car.

The need for such a plan of coordination is pointed up in the mass of statistics that have been compiled during the two years that the project has been under development at Electro-Motive. These figures show that in the five years following World War II the railroads of the United States have spent more than six and one-half billion dollars for new equipment and facilities. Yet, during this period, less-than-carload shipments have declined steadily and over-all freight traffic has shown an average annual increase of only 3.6 per cent compared with 1946. Motor carriers, meanwhile, although enjoying a rapid increase in freight revenues on a ton-mile basis, have experienced more and more difficulty operating at a profit on long inter-city hauls where they are harassed by varying state load restrictions, the trend toward weight-distance laws, and dependence upon an inadequate highway system.

This plan offers railroads a revenue producing service potentially six or more times as profitable as that derived from the typical lcl boxcar, and provides truckers with a dependable high speed service that will cut-over-the road costs. Thus, the motor carrier will continue as the primary carrier, but instead of competing with the railroad, will become the customer of the railroad in an improved service of benefit to everybody.

The Clark Equipment Company attachment developed for the Ross lift truck used in this program enables any standard heavy duty fork lift truck to position a highway trailer on a railroad flatcar in a matter of minutes. This means that existing equipment may be used for side-loading and unloading highway trailers up to 35 feet in length.

In General Motors program, the trailer transport car, the loading and unloading device, and the proposed terminals have been presented as satisfactory answers for rail highway facilities—not as the ultimate in design. Solution of the mechanical problems now provide the opportunity for far-sighted representatives of the railroad and motor carrier industries to make rail highway coordination a reality—a reality of benefit to everyone.



A night view of the Rayville plant with its Christmas star high above. This municipal plant has long been a star performer, earning an operating profit of \$280,935.53 in 5 years.

RAYVILLE, LOUISIANA

**Fairbanks-Morse Unit Generates 7,688,000 kwh.
at Average Fuel Cost of 3.19 Mills per kwh.;
Other F-M Diesels Converted to Dual Fuel**

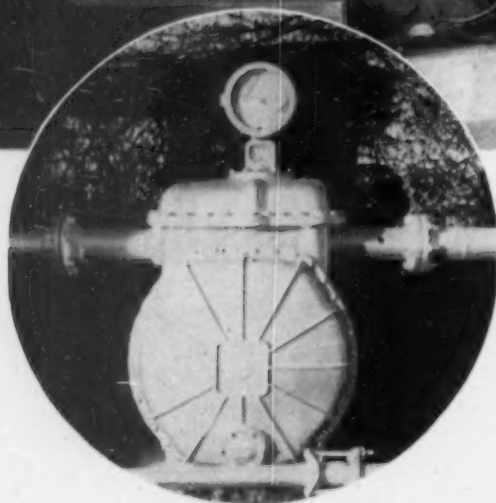
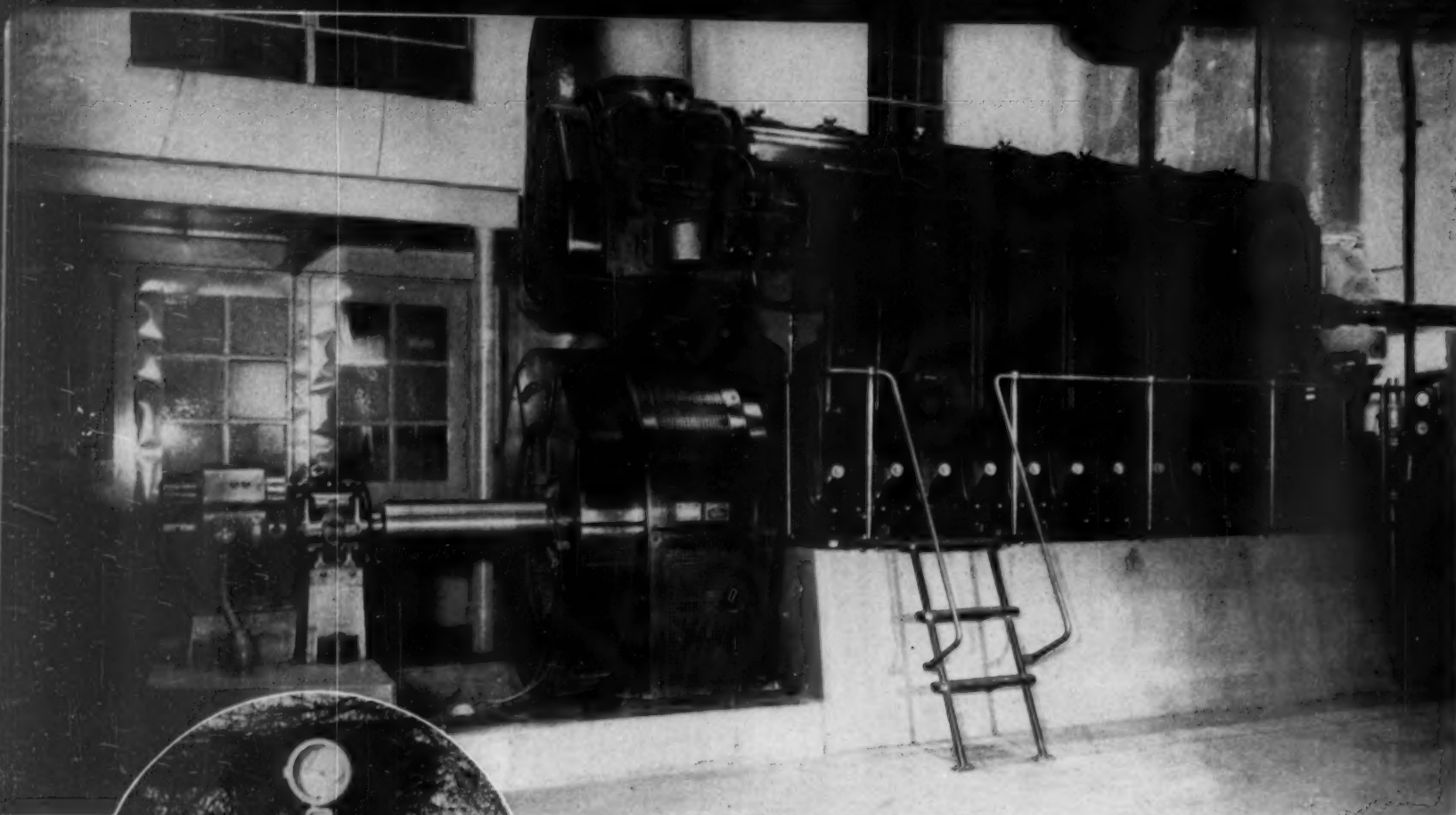
THE first Fairbanks-Morse opposed-piston engine ever installed for dual-fuel operation completed 8,875 hours of service by the end of 1952 in the Rayville, La., municipal power plant. In that period, the OP was the most efficient unit in the plant, producing 7,688,000 kwh. at an average fuel cost of 3.19 mills per kwh. The Rayville plant has other claims to distinction, but currently it rates interest as the best showplace of the OP engine's dual fuel performance. The 10-cylinder Model 38D8-1/8 Fairbanks-Morse opposed piston engine, rated at 1600 hp. at 720 rpm., was installed in mid 1950 in the space formerly occupied by a 360 hp. diesel. The engine drives directly an 1136

kw., 2400-volt alternator with direct-connected exciter.

The OP ran its first 284 hours on fuel oil and then, in September, 1950, began regular operation with natural gas fuel with small charges of oil as pilot fuel to initiate combustion. The unit has worked a steady six-day week ever since. For three or four months, when the cotton gins are running at full speed, the OP operates 24 hours a day at loads from 1,000 to 1,100 kw. The rest of the year, the engine carries about 750 kw. for some 15 hours a day. Superintendent Henry Blakeman reports that operation of the engine has been completely

trouble-free, without an enforced shutdown. The unit runs smoothly and steadily at virtually full load week after week. In more than two years of service, the OP produced 7,688,000 kwh. while consuming 84,500 mcf. of natural gas and 58,428 gal. of pilot oil. This is an average of 10.9 cu. ft. of gas and 0.0076 gal. of oil per kwh. According to Mr. Blakeman, the gas has a heating value of about 800 btu. per cu. ft. At full load, the engine produces a kwh. on just 10.7 cu. ft. of gas and 0.006 gal. of oil, a total heat input of just 9,412 btu.

With gas at 22.5 cents per mcf. and fuel oil at 9.5 cents a gallon, average cost per kwh. for engine's



▲ This 1600 hp. engine is the first F-M opposed-piston diesel ever installed for dual fuel operation. By the end of 1952, the unit had completed 8875 hrs. of trouble-free service.

◀ The Rayville plant utilizes natural gas as its principal fuel. Gas consumption is measured by this American Meter Co. meter.

full dual-fuel production has been just 3.19 mils. Naturally, the engine builder has had special interest in the performance of this unit and prevailed upon Rayville officials to pull pistons after 4,800 hours for a check of wear on rings, liners, bearings, timing chain and sprockets. Mr. Blakeman reports that nowhere could he find measurable wear. In two and a half years, the only repair has been replacement of two injection nozzle tips.

Pioneering is nothing new to Rayville. The town bought out a utility company in 1915, taking over a small distribution system and a 35 kw. generator with steam engine to drive it. The first Fairbanks-Morse engine, a 75 hp. unit, was acquired the next year. Then followed a long succession of F-M diesels: a 150 hp. Type Y, Style V engine in 1924, followed by a similar 100 hp. unit later the same

year; a 480 hp. Model 33 diesel in 1927; a 300 hp. Model 32E14 in 1938; a 1,000 hp. Model 33F16 in 1945; and finally the 1,600 hp. Model 38D8-1/8 in 1950. The oldest and smallest engines were removed to make way for later units and today only the four newest engines remain in the plant. But things have been happening to these engines. The 480 hp. Model 33 was the first of its type to be installed in that territory back in 1927. Then in 1939, the diesel was converted to modern open head design. Finally, in 1950, the 23-year old engine was converted to dual-fuel operation. The 1,000 hp. Model 33F16 was converted to dual-fuel service at the same time and the two units ran their first full month on natural gas in June 1950. Joined by the OP, the gas-burning engines were able to carry the full peak loads which reached 1900 kw. in 1952.

The effect of economical gas fuel is evident in Table I which gives figures on fuel consumption and costs for the past five years. In 1949, the last full year on oil, average cost per kwh. was 8.5 mils. In 1950, the transition year, it was down to 4.7 mils. In 1951 and 1952, years of full dual-fuel operation, the plant average was 3.4 mils. This has been a profitable plant for decades but in recent years profits have climbed impressively. Table II shows how the plant earned an operating profit of \$280,935.53 in the five fiscal years ending September 30, 1952. The most profitable year was the last when operating profit reached \$77,910.05. Table III gives details of income and expenditures for this year.

Profits are used to pay off bonded indebtedness, to help run other city departments and for public improvements such as sewage system, city hall, swimming pool, airport, stadium, fire equipment, street paving and the like.

In the past three years, 100 new residences have been constructed and population has risen to 4,500. In the past two years, the town has gained a new national bank, a new telephone building, a new theatre, a new parish health center, two new churches, a \$500,000 parish courthouse and a \$300,000 public school. Even the 1950 plant expansion was not sufficient to meet this community growth and the town sold \$285,000 in revenue bonds on October 29, 1952, to finance the purchase of a 1920 hp. engine. The new unit will be a 12-cylinder, opposed-piston Fairbanks-Morse dual fuel engine and will replace the 300 hp. diesel, the last oil engine in the plant. An unusual testimony of the public's confidence in the plant and its management was the fact that the bond issue was approved without a single dissenting vote. The success of the plant has firm basis in sound management and operating policies. The heavy duty prime movers have the protection of full accessory equipment. A

TABLE I

Cal.	Kilowatt	Peak	Cost		MCF	Cost	Total	Per
Year	Hours	Load	Gal. Fuel	Fuel Oil	Gas	Gas	Cost Fuel	Kwh.
1948	3,207,600	830	312,760	\$27,123.000084
1949	3,819,700	1010	381,800	32,496.000085
1950	4,798,000	1250	138,300	13,100.00	43,285	\$ 9,739.10	\$22,839.10	.0047
1951	6,389,000	1700	56,470	5,362.22	74,292	16,713.76	22,078.98	.0034
1952	7,155,600	1900	57,250	5,439.48	85,780	19,304.80	24,744.28	.0034

detergent-type lubricating oil is used in the OP pressure system. Some oil is bled from this circuit through a 10-element cellulose filter. In addition, lube oil is drawn from the sump by a motor-driven pump, put through another cellulose filter and returned to the sump. Oil is cooled in coils in an evaporative cooler. Lube oil economy has been good with the OP using just 50 gal. for a week of 24-hour operation, at average of 5,376 rated hp. hrs. per gal. for the period.

All engines in the plant have closed cooling systems using treated jacket water. The two big engines are served by a pair of evaporative coolers equipped with thermostatic controls which regulate cooler shutters and bypass jacket water as necessary to maintain desired temperatures. The 32 gravity fuel oil is unloaded from truck or tank car into a 10,000 gal. storage tank, then passes through an activated clay purifier to individual day tanks which are placed vertically and calibrated at 10 gal. to the inch for easy stick measurement. Each engine is also equipped with an overhead emergency fuel tank. If normal pilot oil pressure fails, gas supply is shut off automatically and a check valve opens admitting oil to the main injection pumps. This is sufficient to keep the engine operating for about two hours while the normal pilot fuel system is being repaired. All engine air is filtered. Exhaust gases vent through snubbers.

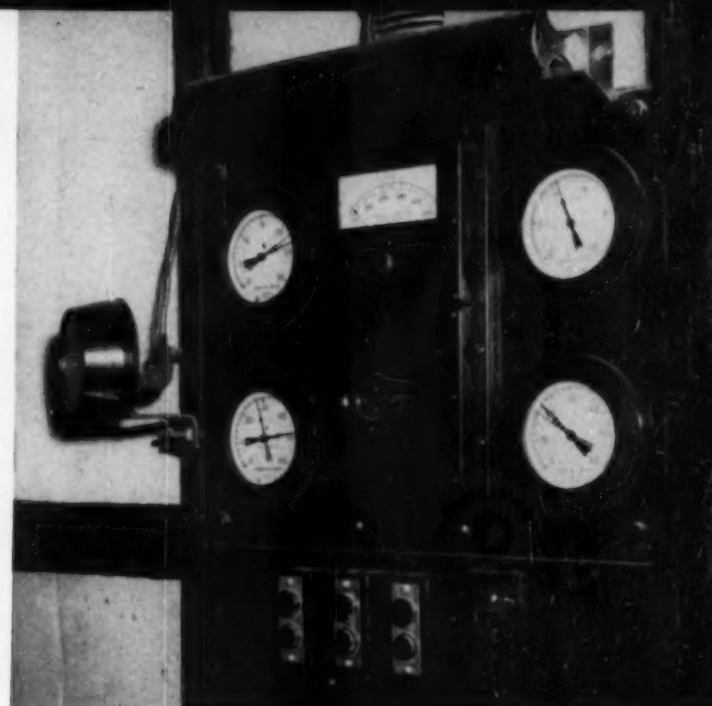
TABLE II

Year Ending	Gross Revenue	Operating Expense	Operating Profit
9/30 1948	\$102,024.79	\$77,514.87	\$24,509.92
1949	129,671.94	79,509.38	50,162.56
1950	127,148.02	67,373.18	59,774.84
1951	152,596.29	84,018.13	68,578.16
1952	165,772.14	89,938.85	77,910.05
			\$280,935.53

TABLE III

Revenue & Expenses—Year Ended Sept. 30, 1952	
<i>Revenue</i>	
Water & Light Sales	\$150,616.81
Water & Light Services to town (Est.)	15,000.00
Tapping fees	1,683.00
Insurance Receipts	229.68
Miscellaneous	319.41
TOTAL REVENUE	\$167,848.90
<i>Expenses</i>	
Elec. Salaries	\$ 19,434.54
Elec. Maintenance & Repair	17,577.40
Water Salaries	12,574.31
Water Maintenance & Repair	3,736.97
Administration Salaries	2,394.00
Administration Expense	1,272.50
Fuel (Oil & Gas)	25,650.88
Lube Oil	1,526.67
Insurance	4,879.20
Auditing	600.00
Miscellaneous	292.38
TOTAL EXPENSES	\$ 89,938.85
Net Operating Revenue	77,910.05
Interest Expense	6,597.29
Net Revenue	\$ 71,312.76

The OP engine is served by a Fairbanks-Morse gauge panel which includes an Alnor exhaust pyrometer and Marshalltown gauges.



The Rayville plant is operated under the direction of Superintendent of Light and Water, Henry Blakeman. Other city officials concerned with the efficient planning and operation of the municipal utility are: Mayor Loy C. Cloninger, Town Clerk W. A. Cooper, and Aldermen J. Pervy Barker, James R. Craig, William P. Fletcher, William N. Gains and J. E. Moore.

List of Equipment

Engine—1600 hp., 10 cylinder, 720 rpm., opposed-piston dual fuel, Model 38D8-1/8, Fairbanks, Morse.
 Generator—1136 kw., 1420 kva., 3 ph., 60 cycle, 2400 volt, Type TGZO alternator, Fairbanks-Morse.
 Governor—Woodward.

Fuel oil—Simmons Oil & Refining Co.
 Fuel purifier—Honan-Crane.
 Fuel filters—Nugent.
 Natural gas—Louisiana Power Co.
 Gas meter—American Meter.
 Lubricating oil—Essolube MD. Esso Standard Oil Co.
 Lube filters—Honan-Crane.
 Auxiliary lube pump—Roper.
 Water pumps—Fairbanks-Morse.
 Evaporative coolers—Fairbanks-Morse.
 Water softener—Permutit.
 Air filters—American Air Filter.
 Exhaust snubbers—Burgess-Manning.
 Switchboard—General Electric.
 Alarm panel—Fairbanks-Morse.
 Exhaust pyrometer—Alnor.

Lubricating oil for the 1600 hp. OP engine is by-passed continuously through the Fairbanks-Morse cellulose filter at left. The Honan-Crane purifier at right cleans lube pumped from the sump and then returns it to the sump.



NEVADA'S century-old wide-open frontier ways of life including legal gambling and marital partnership fractures has added a third "calculated risk" industry. It is open-pit, or strip, mining to lift a sagging post-war industry into a new trend that bids fair to open up many known marginal mines where strategic minerals for industry and war are to be found. It will also spur the search for such metals as are now so scarce they have to be imported at "political" prices. Two years ago the writer looked in on Nevada's heavy construction, road building and mining industry in a brief visit that revealed that Reno was the capital of some of the world's best road building, mine stripping and dirt moving organizations. Wells Cargo and Isbell Construction Company were two that had risen from mule-skinned and second-hand gasoline equipment to multi-million-dollar dieselized machines, with management, operators and shops to handle any job put up to them in transportation, road building or dirt and ore moving.

Nevada mining today is full of mixed emotions, to put it mildly, when comparing the old small operations that are hanging on against the post-war trends. The big open-pit, or stripping, operations for copper overshadow the dozens of little old style owner-operator mines that live on tradition and hope for the "old days," luck and/or government aids. The lead and zinc operations are shutting down and only producing as by-products of copper mining, generally. The Nevada Mine Operators Association insists there is no boom in Nevada, regardless of all the big headlines about the copper and tungsten mining by the big mining corporations with headquarters in New York and plenty of financing and price guarantees of their mineral output aimed at putting the nation on an independent basis. Louis D. Gordon, executive secretary of the operators association, points to the time when Nevada was No. 1 mining state, compared to today when the state is only fifth in copper and second in tungsten.

To get a fair overall picture of Nevada's mining industry and its types of mines, locations, ownership, history of its ups and downs, and kinds of



NEVADA GOES OPEN-PIT MINING

By F. HAL HIGGINS

minerals now being actively mined, the writer called on State Inspector of Mines Mervin J. Gallagher, the Nevada Bureau of Mines and the Mackey School of Mines. The latter two are located at the University of Nevada in Reno. Mackey of the "Big Four," Silver and Postal Telegraph is the big name in Nevada mining history, of course. His statue stands in front of the Mackey School of Mines. At the Nevada Bureau of Mines, Mining Engineer Victor E. Kral piloted the visitor around the School of Mines and brought out statistics and reports to

answer questions on the state's metal industry. Kral pulled out the latest statistics he had received from State Inspector of Mines Gallagher but suggested another report was due and the visitor should call at Carson City to obtain this. The twenty-sixth report coming off the press from Gallagher's office revealed these pertinent facts on Arizona's mining industry:

Nevada has 33 mines, mills and smelters hiring 20 or more men. These are scattered fairly well over





Nevada iron ore from this open pit went by truck, rail and sea to Japan to help rebuild that war-wrecked nation. Note diesel tractor. The Northwest shovel here is powered by a Murphy diesel.

Big push power by a TD24 removing overburden to a new Nevada mine.



the state in every county but Elko in the northeast corner of the state. Clark county, down at the point where Hoover Dam and Las Vegas are two big vacation attractions, is the leading county in number of mining operations. Gypsum, building stone, copper, nickel, platinum, flag stone, silica sand, perlite, dolomite, are all being mined in open pit, or strip, operations. Clark county has 650 men working in

21 mines and plants. White Pine county is second in number of active mining operations with 20 mines turning out tungsten, copper, lead, zinc, gold, silver and molybdenum. Five of these are open pit. Kennecott's two mines at McGill and Ruth with 954 and 600 employees, respectively, are the big operations here. Copper, molybdenum, gold and silver are produced at Kennecott's two mines.

Isbell's operation at the Leviathan mine on the Nevada-California border where they are completing the stripping of overburden of a new sulphur mine. The Euclid pictured here has a Cummins engine, the P.&H. shovel a Murphy diesel. A Bucyrus-Erie electric shovel on the same job gets its power from a Cooper-Bessemer diesel housed on top of the mountain.

International TD24 pulling an Isaacson scraper in Nevada for a new operation to bring marginal low-grade ores into production.



Nye county has 17 mines producing magnesite, tungsten, fluorspar, antimony, lead, gold, silver, iron. Six of these are open pit. Pershing county lists 17 mines and plants producing and processing iron, manganese, gold, silver, tin, copper, perlite, tungsten, uranium, antimony, gypsum and perlite. Eleven open pit mines are found in this county.

Running down the list of mining counties, Churchill has two producing iron and diatomaceous earth. Both are open pit. Douglas county has another three mines producing tungsten and iron. Elko lists 8 small mines, barium and tungsten being produced at open pit mines. Esmeralda county lists 13 and five of these are open pit producing soapstone, tungsten and diatomaceous earth. Eureka county has but five mines coming under the inspector's reports. One open pit mine there is producing iron. Humboldt county has eight, four being open pit producing manganese, sulphur, building stone and tungsten. Lander county mine operations add up to 16 in the inspector's list, ten of these being open pit for manganese, barite, tungsten, iron, gold, silver. Lincoln county adds another 10 state-inspected mines of which only two are open pit producing manganese and perlite. Lyon county mines in the list number but four, three being open pit and strip, copper, gold and silver being the minerals.

"Nevada copper production, largely from open-pit mines," said R. B. Maurer in U. S. Bureau of Mines Minerals Yearbook, "responded to the stimulus of

One of the several rail siding dumps where diesel trucks bring iron ore to rail cars for transport to the Ports of Stockton and Oakland for re-shipment via ocean going vessels.

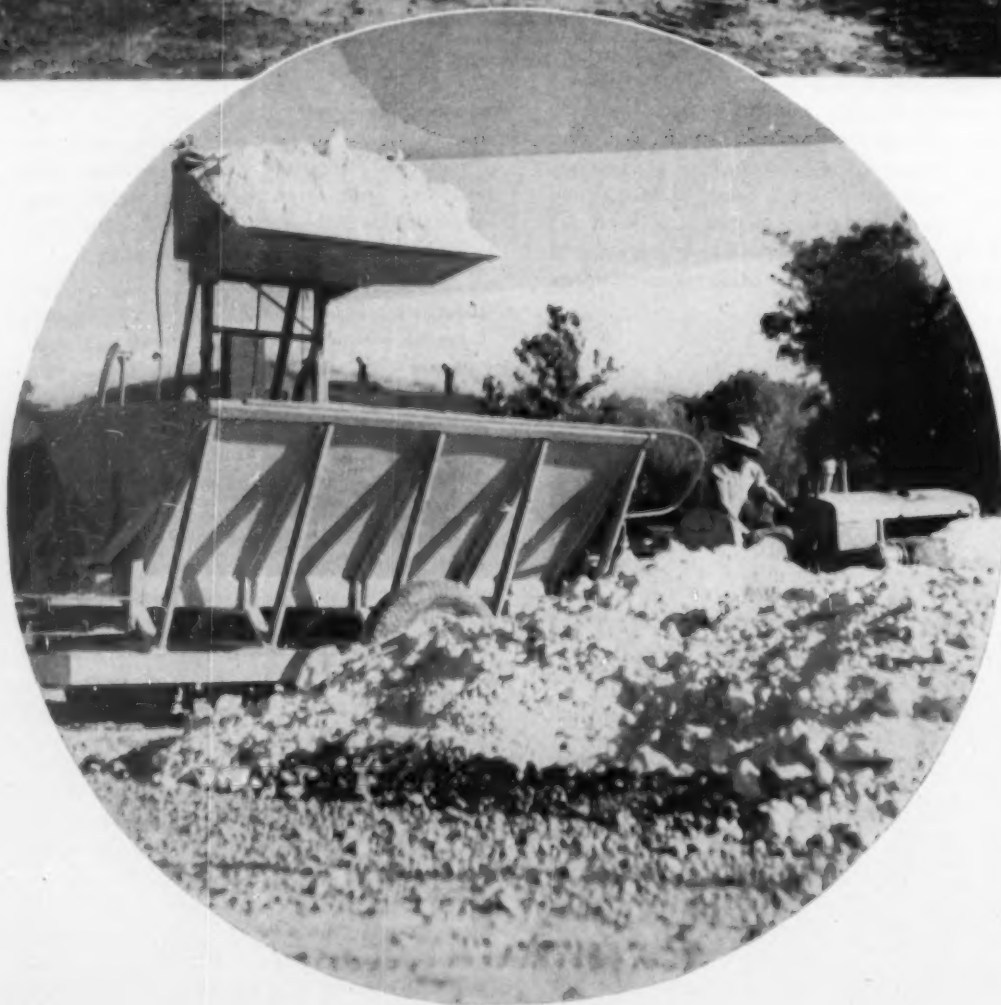


great demand and generally favorable base metal prices in 1950 and advanced over 1949." Total value of gold, silver, copper, lead and zinc recovered from ores, old tailings and gravels mined at 325 lode mines and 25 placer properties in 1950 was \$38,181,872, an increase of 29% over 1949. Copper increased 38% in quantity and 46% in value. Of the total value of the five metals—gold, silver, copper, lead and zinc—copper comprised 57%. White Pine county accounted for 62% of the State's total value of the five metals which were produced in 17 counties.

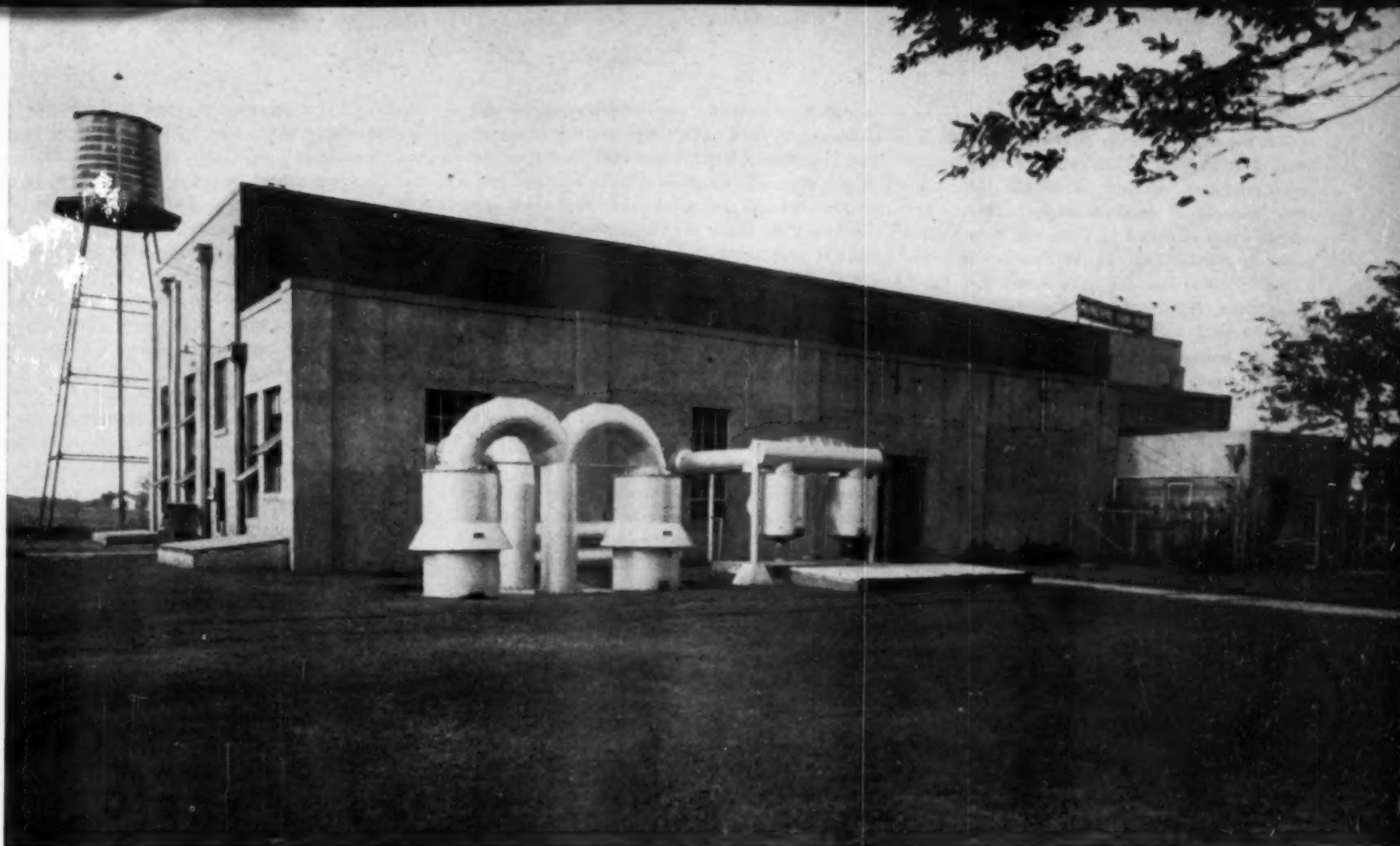
"Copper—Nevada copper production was centered in the Robinson (Ely) district, White Pine county, where the State's leading producers—Kennecott Copper Corp., and Consolidated Copper Mines Corp.—mined the porphyry ore of that district by open-pit method and supplied all but a small percentage of the State's total 1950 copper output."

Getting away from his pages of statistics in his report, State Inspector Gallagher sums up his state's dramatic lift by diesel truck power in these two paragraphs: "Demonstrating the ability of open-pit mine production to respond quickly to changing market conditions, Nevada's copper production after five months of moderate output, rose to a high level in June and subsequent months. It was primarily this expansion in open-pit copper that accounted for the 29% increase in total tonnage of Nevada ores and old tailings sold or treated in 1950 compared with 1949. Lead and zinc mines, predominantly underground operations, responded slowly to the incentive of higher metal prices because ore reserves needed for expanded production were not developed during the preceding period of depressed metal prices. Mining of precious metal ores declined sharply in late 1950 owing to the fixed gold price in the face of steadily increasing operating costs. The collapse of custom milling in the Virginia City-Silver City area of Lyon and Storey counties, and at Gold Point, Esmeralda County, virtually halted mining of precious metal ores in these and neighboring districts after September. It was significant that the state's six leading gold producing mines in 1950 were worked by surface methods.

"Led by the Natomas Co. bucket-line dredge in Lander county and the Round Mountain Dredging Corp. conveyor-milling operation in Nye county, Nevada placer mines treated 5,243,450 cubic yards of material averaging \$0.243 per cubic yard in 1950 compared with 1,382,140 cubic yards averaging \$0.201 per cubic yard in 1949. Of the 25 placer mines that reported production in 1950, one was worked by bucket-line dredge, 10 by power excavators and washing plants, 3 by underground methods, and 11 by small scale hand methods."



Nevada gypsum, mined and shipped to the California market, is here being loaded and spread on a field by two Hercules-powered tractors to open up tight soil and aid water penetration.



The Municipal plant at Vernon, Texas, has six prime movers of which three are dual fuel engines. The American air filters shown here, at left, serve the Fairbanks-Morse opposed piston engine.

VERNON, TEXAS

New Fairbanks-Morse Opposed Piston Dual Fuel Tank for Vernon Produces Power at Fuel Cost of 2.51 Mills Per Kwhr.; Another OP Being Installed

By ROBERT D. SLONNEGER*

A 1920 horsepower Fairbanks-Morse, opposed-piston, dual fuel engine, installed in 1952, is producing electric power for a total fuel cost of 2.51 mills per kilowatt-hour in the Vernon, Texas, Municipal Light and Power Plant. This unit has brought the total installed capacity of the Vernon plant to 4520 horsepower in dual-fuel engines. Three straight diesel engines totaling 2300 horsepower give the plant a total capacity of 6820 horsepower. A 2960 kilowatt peak load in August 1952 and an even higher load expected in 1953 indicates that the engine using the cheaper natural gas fuel will not be able to carry the load. Already, another opposed-piston engine like the unit in service is being installed to remedy this uneconomical condition in the Vernon plant.

*Assistant Professor of Mechanical Engineering, University of Texas.

In 1928 the present light plant was placed in service; a service which operated in competition with a public utility high line, a situation that still exists.

Gradual evolution has been the rule in the expansion of electrical service in this North Texas commercial and agricultural center. Situated about fifty miles west of Wichita Falls near the Oklahoma State line, Vernon's only industry consists of a meat packing plant and a clothing manufacturer. Actually the power supplied to the latter factory sets many "good deeds" in action for the principal product is Boy Scout uniforms. The increased use of air conditioning in private homes and business establishments has been in large part responsible for increased demand. Mr. Tom Sharp, plant superintendent, cites as the largest individual recent increases, the installation of air conditioning by several of the large churches. It has always been

the policy to supply electricity and water to the churches at one-half the usual rate, and the city has no intention of changing this policy even though there has been a large increase in the usage by the churches. As the plant was enlarged to meet the growing needs of the community, the physical make-up of the plant has changed in many ways; dual fuel engines have replaced diesel engines, the size of the individual units has been increased, fuel handling technique has changed, cooling systems of various types have been tried, and many more changes have been effected. Always the idea has been more power at a lower cost. Another less obvious but quite important change has been the evolution of operating policy. Not too many years ago a work week of 7 days was the rule; now the plant operators work a 6-day week and are granted liberal summer vacations. Equipment and policy must both keep in step with the times.

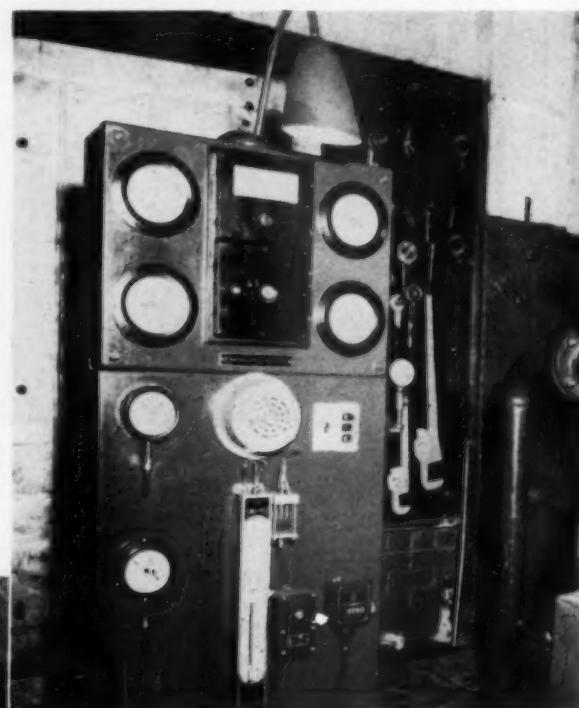
At present the plant has 6 prime movers ready for service: two 625 horsepower Fulton straight diesels, which were original equipment; one 1000 horsepower dual fuel Nordberg, installed in 1939; one 1050 horsepower Fairbanks-Morse, Model 33 straight diesel, installed in 1941; one 1600 horsepower Fairbanks-Morse, Model 33 dual fuel, installed in 1947; and one 1920 horsepower Fairbanks-Morse, O-P, Model 38D8 $\frac{1}{4}$, dual fuel, installed in 1952. In 1949 the 1000 horsepower and the 1600 horsepower engines were converted to dual fuel operation, while the newest engine was installed as a dual fuel unit. The economy realized by utilizing the abundant supply of inexpensive natural gas available in the area is by now an accepted fact by plant operators. Operating data from the Vernon plant are no exception to the rule.

For the period from February 1952 through April 1953, the cost of fuel (gas and pilot oil) was 2.54 mills per kw. hour; while lubricating oil costs amounted to just 0.45 mills per kw. hour. Thus the total cost for fuel and lubricating oil for the modern engines in the plant is 2.99 mills per kw. hour.

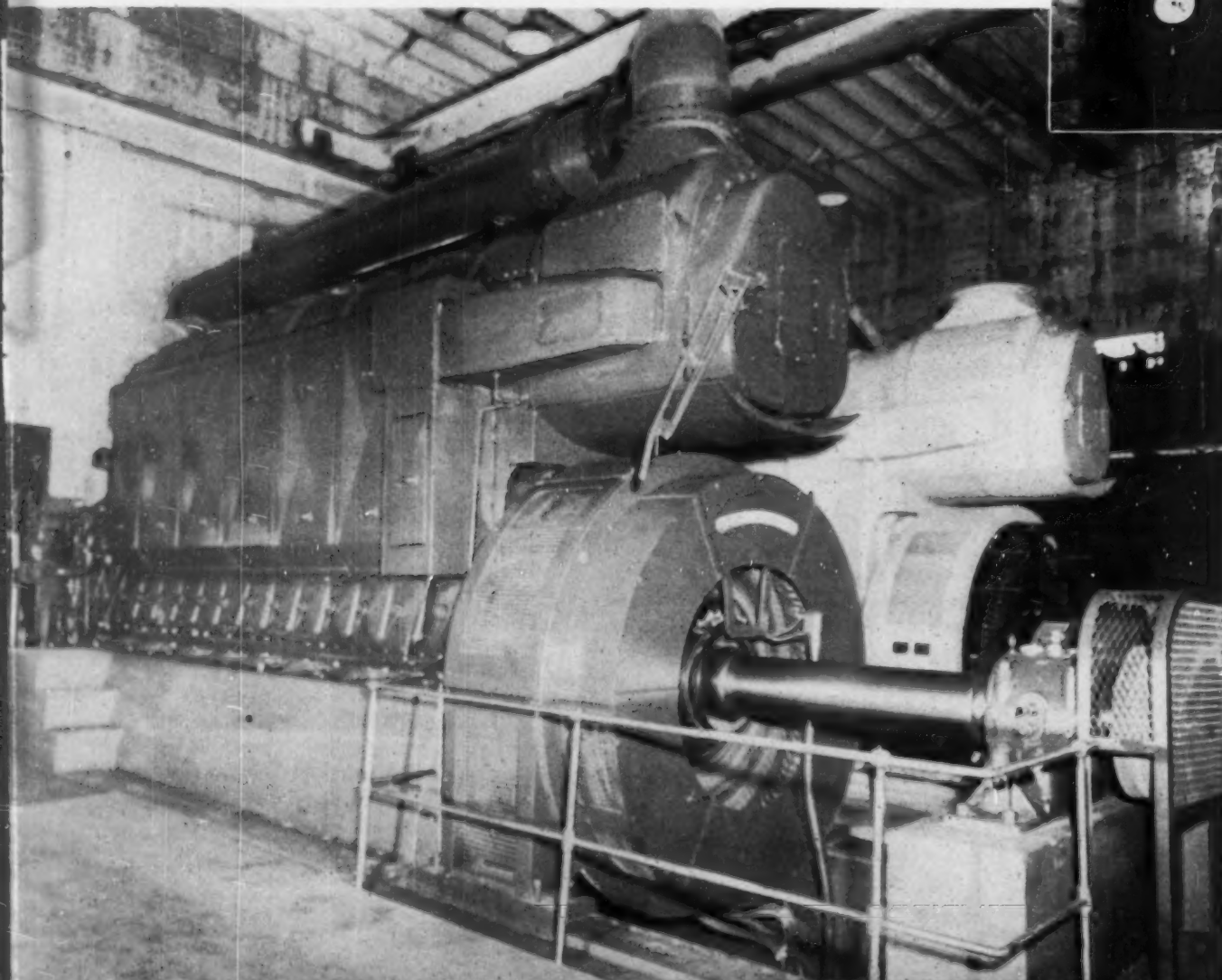
Fuel costs for gas at 15 cents per mcf., fuel oil at 8 $\frac{1}{4}$ to 9 $\frac{3}{4}$ cents per gallon, and lube oil from 49.5 to 51 cents per gallon were used in the determination of the overall performance figures. In balancing the service on the engines in the plant, the operators naturally use the dual-fuel units almost to the exclusion of the oil-burning engines and then try to utilize the engines that will provide the best load factor and operating efficiency.

Installation of another opposed-piston engine will undoubtedly effect further improvements in operating procedure. Under present load conditions, the newest engine in the plant is being operated relatively few hours per month, with many starts and stops. Yet, the engine is giving service at a fuel cost of 2.51 mills per kwhr., while the lubricating oil cost is 0.38 mills per kwhr. Both of these figures are below the plant average, so surely as soon as one of the older engines can be retired in favor of a new F-M engine, the two OP's will work a heavier schedule and operating costs will be reduced even more. Table I shows the month by month story of the 1920 horsepower opposed-piston engine, from the month of installation through April, 1953. Peak load on the system, and space available in the plant were the two principal factors which governed the selection of the two new units. In 1952 the winter peak was 1920 kilowatts, summer 2960 kilowatts, and the spring and fall peak loads were about 2100 to 2300 kilowatts. With the inevitable increases in these values, larger sized engines were selected. Natural gas from the high pressure mains is metered at 150 psig. and is then regulated to the desired pressure at each engine. The metering of the gas is performed by the gas company, and the cost of the fuel is a function of the heating value of the gas. Two grades of fuel oil are used. A lower quality oil is used for straight diesel operation while the pilot fuel is a zero distillate type oil. The diesel oil is stored in two 30,000 gallon underground fuel tanks, and the pilot oil tank has 1500 gallon capacity and is located above ground. Actually diesel fuel is used as pilot oil in the opposed-piston engine. The fuel is transferred to the day tanks by

means of a gear type transfer pump. Fuel metering is accomplished with a tank level gauge located on the engine control panel, each shift filling the tank and recording differences in the fluid level. The 12 cylinder, Model 38D8 $\frac{1}{4}$, Fairbanks-Morse, opposed-piston, dual-fuel engine is installed with the accessory end of the engine about 6 feet from the outside wall of the plant. The generator is nearest the switchboard, a reversal of procedure from some of the earlier installations in the plant. There is a basement under the accessory end of the engine which contains the lubricating oil filters, the before-operation pump, as well as serving as a terminus for a trench leading to the outside evaporative cooler. The gas fuel is brought to the engine gas valves at 19 psig. Fuel oil is picked up by the engine-driven

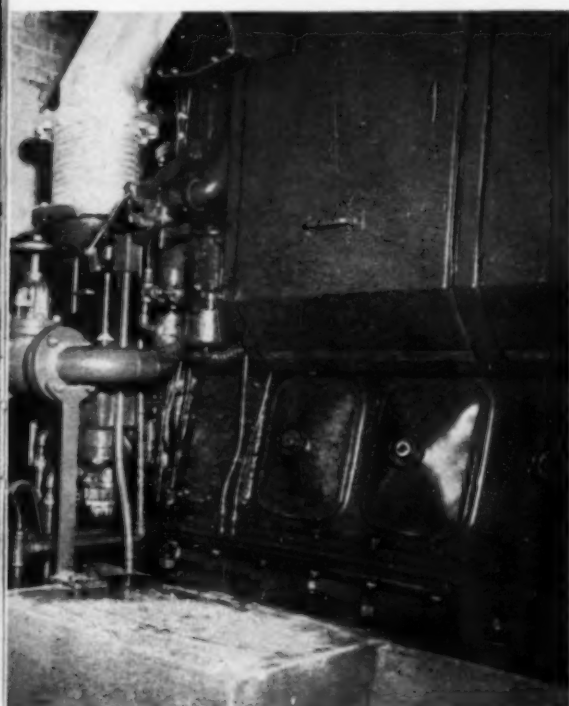


This view shows the simple control for the opposed piston engine and the conveniently located Fairbanks-Morse panel which includes an alarm system, a Uheling fuel tank meter and an Alnor pyrometer. To the right on the engine is the Chicago Metal Hose flexible exhaust connection.



Most powerful engine in the plant is this 1920-hp. Fairbanks-Morse opposed-piston dual fuel unit with a Michle-Dexter scavenging blower installed in 1952. With this engine producing power a total fuel cost of 2.51 mills per kwhr., the city is installing a second OP engine which can be seen in the background.

pump from the day tank, delivered through a twin-cartridge filter to the injection pumps. Fuel not required is by-passed and returned to the day tank. An oil bath filter is used on the intake to the engine-powered, Roots-type, scavenging blower. Since the blower is located on the upper part of the engine, the inlet pipe rises to blower height outside the building making a straight run to the blower. Air supplied to the engine can be varied by the manually controlled valve on the discharge side of the blower. As this valve is closed for part load operation, part of the air from the discharge is returned to the suction side. On this particular installation the plant superintendent has devised an extension to permit the operator to control the valve position from the operating floor level.



Governing is accomplished with a Woodward governor which permits the engine to be started as a straight diesel and provides for automatic switch over to diesel operation in case of a failure in the gas supply. An exhaust silencer located near the air intake filter receives the exhaust gases from the straight exhaust line which leaves the building at about the same distance from the floor as does the incoming air line. The silencer and air filter are neatly mounted high enough to permit easy access for inspection and required service procedures.

All of the engines in the plant operate with a closed cooling system. In the Vernon area, the water has a high amount of solid impurities necessitating treatment of make-up jacket water with the Zeolite system of water treatment. All of the units except the new F-M engine use heat exchangers and a raw water system with a large spray pond for cooling.

High winds are the rule for this section of Texas for a large part of the year, and a fairly substantial windage loss influenced the selection of an evaporative cooler for the jacket water and lube oil with the new engine. This unit is located in a neat, galvanized iron building just outside the plant. Louvers, cut in the building near the ground level,

TABLE I

1920 Hp. Dual Fuel O.P. Engine

Month	Total load Kwh.	Fuel Gas Mcf.	Consumed— Pilot Oil Gal.	Fuel Cost Total	Fuel Cost Mills/Kwh.	Lube Oil Gal.	Lube Oil Cost— Dollars	Lube Oil Cost— Mills/Kwh.
1952								
Feb.	117,000	1,525	1,270	\$339.91	2.91	727	\$370.77	3.17
Mar.	326,000	3,682	2,720	776.73	2.38	300	153.00	10.47
Apr.	140,000	1,606	1,290	347.26	2.48	110	56.10	0.40
May	231,000	2,626	2,030	561.31	2.43	213	108.63	0.47
June	380,000	2,996	2,690	671.28	1.77	278	141.78	0.37
July	446,000	4,475	3,170	932.71	2.09	339	172.89	0.39
Aug.	511,000	5,758	3,720	1170.65	2.29	382	194.82	0.38
Sept.	147,000	1,906	2,000	450.86	3.07	150	76.50	0.42
Oct.	161,000	2,031	1,750	462.08	2.87	125	63.75	0.40
Nov.	137,000	1,691	1,090	351.80	2.57	99	50.49	0.37
Dec.	85,000	1,132	750	237.32	2.79	69	35.19	0.41
1953								
Jan.	144,000	1,657	1,300	\$62.33	2.52	95	48.45	0.34
Feb.	199,000	2,486	2,230	556.82	2.80	75	38.25	0.19
Mar.	164,000	1,963	1,420	411.64	2.51	111	56.51	0.34
Apr.	85,000	1,378	810	273.48	3.21	55	28.05	0.33

permit the free circulation of air for the cooler. Oil and jacket water are pumped through the cooler by engine-driven pumps. Raw water circuits, heat exchangers, the spray pond, and the evaporative cooler are also plagued with the water impurities. Heat exchangers must be cleaned every 60 to 90 days to insure effective operation. At present the raw water is being treated by use of the Sola Catalytic process and although the system has been in operation for a very short period of time some improvement in water condition has been realized. Mr. Tom Sharp expects to solve raw water problems with the installation of the new engine. A horizontal radiator with a large fan will provide the required cooling for jacket water and lubricating oil. This type of installation has been proving very effective in the localities where water is not good.

Straight mineral oil with a clay type filter is used on other engines in the plant, while HD oil with a cellulose type filter is used on the new engine. Inspection has shown 14 months of perfect operation with very little ring wear in evidence. Low lube oil consumption on the O-P has given a lube oil cost per unit of output lower than the plant average.

A maintenance program to fit the plant load and labor force has been devised for keeping the equipment available when it is most needed. Annual inspections and major preventive maintenance are carried out during the winter months when the average load is light. This policy provides careful

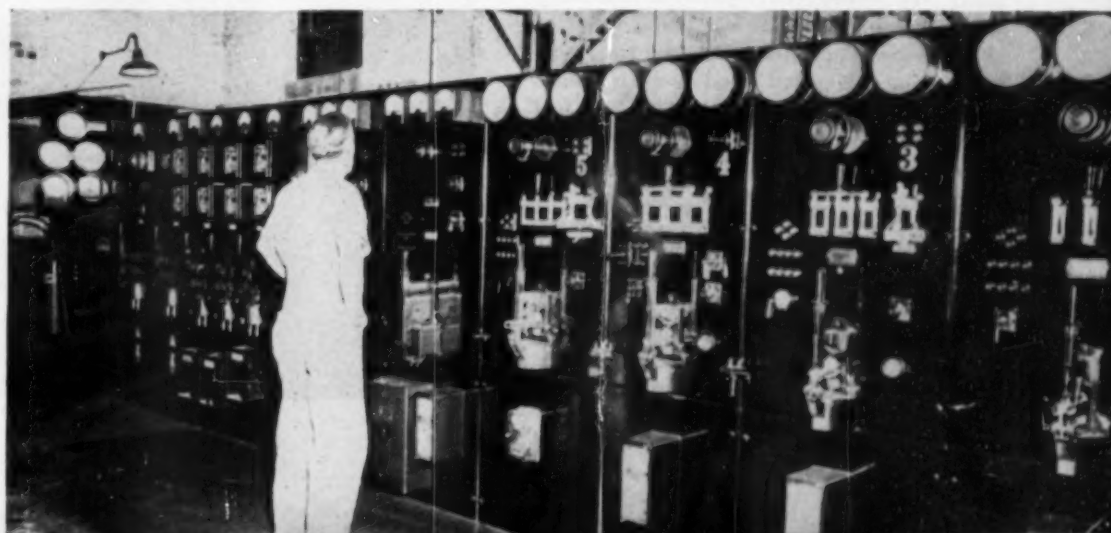
maintenance and frees the special crew for emergency service during the higher peak load periods.

When installation of the second Fairbanks-Morse, opposed-piston engine is complete, the Vernon, Texas, city light plant will be able to utilize even more effectively the cheaper natural gas fuel and at the same time reduce the number of engines on the line. The new cooling system, installed under the same roof with two other systems should prove most interesting and enlightening to operators in the area wanting to make comparisons.

List of Equipment

Engine—Model 38D8½, 12 cylinder, 8½x10, opposed-piston dual-fuel, 1920 horsepower, 720 rpm. Fairbanks, Morse.
Generator—1360 kw. Fairbanks, Morse.
Fuel oil—Cox and Peacock Oil Co.
Gas fuel—Lone Star Gas Co.
Lubricating oil—Phillips Petroleum Co.
Fuel oil filter—Nugent.
Lubricating oil strainer—Air Maze.
Fuel tank meter—Uheling.
Governor—Woodward.
Exhaust silencer—Maxim.
Air filter—American Air Filter.
Evaporative cooler—Fairbanks, Morse.
Raw water treatment—Sola Catalytic.
Pyrometer—Alnor.
Before operation pump—Roper.

Panels for the new engine are included in this General Electric switchboard.



CANADIAN Vickers Ltd. of Montreal is again delivering ships to The Flota Mercante Grancolombiana. First two of a series of four additional motorships, the *Ciudad de Valencia* and *Ciudad de Cali*, have been in service several months. The other two vessels, the *Ciudad de Ibagu* and *Ciudad de Cumana* will be delivered in the forthcoming months. In accord with their multi-million dollar building program, Flota Mercante Grancolombiana, S.A., placed orders with Canadian Vickers for the construction of these four new vessels to augment their very fast cargo carrying service between the major ports of Venezuela, Colombia, Ecuador, New Orleans, New York and Montreal. Propulsion power for the additional four ships, as well as for three similar vessels built by Canadian Vickers for the Grancolombiana firm in 1949, is supplied by single Nordberg two-cycle marine diesel engines rated 4275 bhp. at 160 rpm. These Nordberg propulsion units are direct connected to the shaft permitting a service speed of 14½ knots.

Especially designed by Canadian Vickers Ltd. to suit the owner's particular requirements, the vessels principal dimensions are: length, 395 ft; beam molded 55 ft. and depth molded to upper deck, 36 ft. 6 in. Each vessel has a dry cargo capacity of 300,000 cu. ft. and a refrigerated cargo capacity of 60,000 cu. ft., an increase of 33,000 cu. ft. over the previous vessels. These ships draw 22 ft. 3 in. in loaded condition and at this draft have an approximate deadweight of 6,000 tons. Outwardly, the ships present an extremely distinctive and attractive appearance with funnel and deckhouses streamlined within practical limits, and a sweeping line from upper deck to bridge following and complementing the line of the funnel. An unorthodox paint line is swept down to the soft nosed, raked bow, accentuating the size and speed of these vessels. The owners' colorful crest, painted high on the bow and on the funnel of the new ships, contributes noticeably to their smart appearance.

The cargo holds are mechanically ventilated by reverse axial flow fans fitted in the ventilator coamings and capable of changing the air six times per hour. No. 3 hold is insulated with Fiberglas and is designed for carrying refrigerated cargo. The refrigeration system was designed by Canadian Ice Machine Co. in co-operation with the York Corporation, and the shipbuilder's own staff, and features extreme versatility. Frozen meats can be carried in one compartment at 10°F, fruits in another at 35°F and bananas in another at 56°F simultaneously. It is anticipated, however, that the vessels will normally run north with a full cargo of bananas. Well aerated cool cargo can be maintained at higher than atmospheric temperature by means of strip heaters. Automatic controls are fitted to all parts, but manual operation and control is possible without changeover. The entire plant is located and readily accessible in the engine room. Portable bins are provided for the speedy storage of cargo.

Each ship is propelled by a single Nordberg six-cylinder diesel engine, rated 4275 bhp. at 160 rpm., direct connected to the propeller shaft. The engine has a 29 in. bore by a 40 in. stroke and is of the two-cycle, single-acting type with port scavenging and port exhaust. The propulsion diesel is independently scavenged by two motor-driven blowers



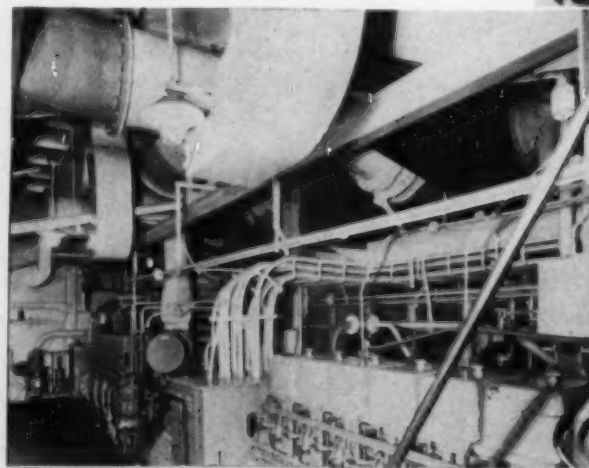
Ciudad de Cali, one of four new Nordberg diesel motorships, has a service speed of 14½ knots.

each of 200 hp. rating, taking air from the engine room through a Maxim silencer and each discharging 10,000 cfm. at about 2.4 psi. discharge pressure to a common intake manifold. This method of obtaining scavenge air results in a shorter engine and in case of failure of one of the blowers, the engine is still capable of maintaining 70% ship speed with the remaining blower.

The main engine control platform is at the after end of the engine on the port side and the log desk, engine telegraph, instrument panel, alarm panel, telephone booth are all disposed conveniently around the operator. The starting air compressors are located within view of the operator and are actuated by automatic controls. They have an actual air delivery of 68 cfm. at 870 rpm. and are of the two-stage type, water cooled and fitted with inter and after cooler.

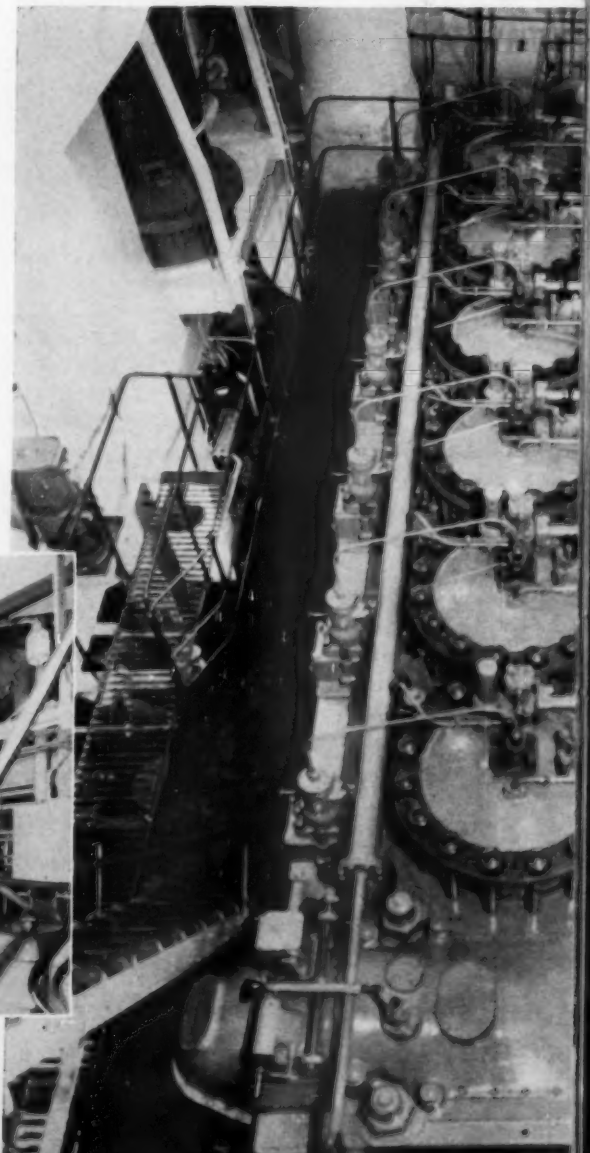
Auxiliary power on each of the vessels is supplied

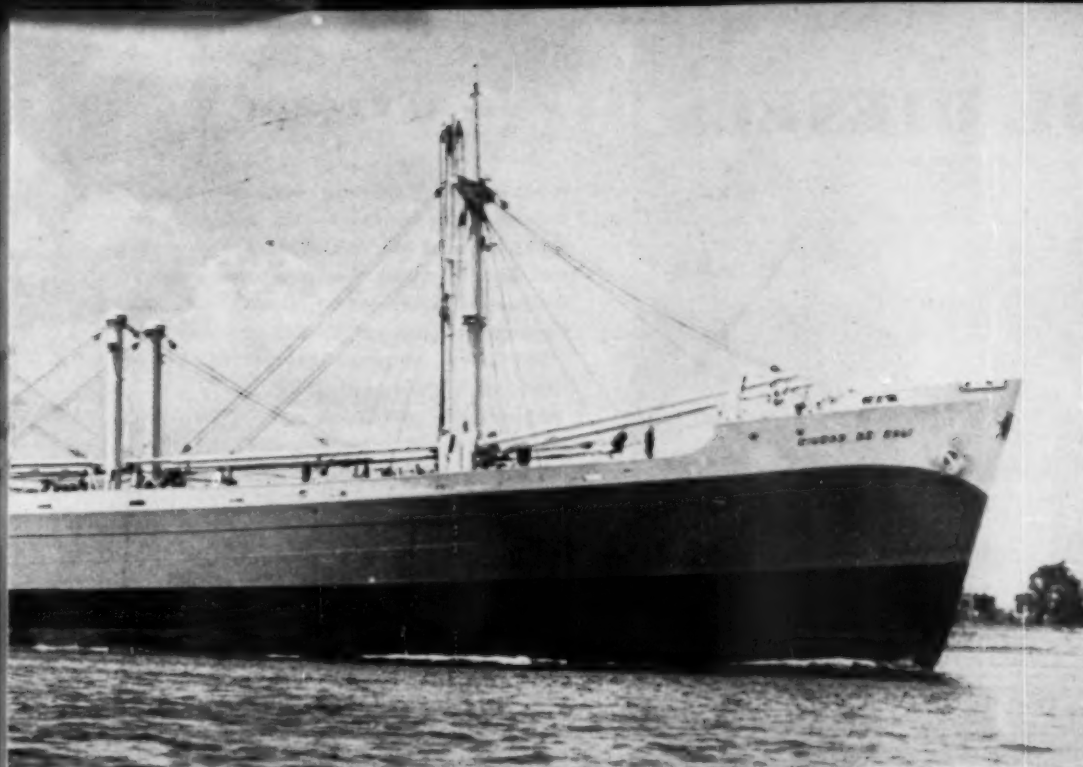
Two of the three 580 hp., 400 kw. Nordberg four-cycle diesel auxiliary generating units.



FOUR NEW M

By DOUGLAS





el propelled motorships for Flota Mercante.
a, has a service speed of 14½ knots.

MOTOR SHIPS

GLASS SHEARING

by three Nordberg four-cycle, eight cylinder inter-cooled-supercharged diesel engines. These engines are of the single acting, trunk piston, mechanical injection type with cylinders of 9 in. bore and 11½ in. stroke rated 580 hp. at 600 rpm. Each drives a 400 kw. 120/240 volt, 3 phase dc. Westinghouse generator arranged for parallel operation and capable of carrying a 25% out of balance current. A 15 kw. constant speed 240/120 volts dc. standby generator powered by a 2-cylinder Vivian diesel engine of 26 bhp. at 700 rpm. is located on the upper engine room level. A belt-driven compressor with a capacity of 6 cfm. is part of the working equipment on this auxiliary unit. The machinery flat on the port side is divided into two compartments; one is occupied by the engineer's workshop which in-

Upper engine level view showing cylinder heads and fuel injection equipment on the 4275 bhp. Nordberg two-cycle main propulsion diesel in the Ciudad de Cali.

Main control panel for 4275 bhp. Nordberg Marine Diesel in engine room of Ciudad de Cali.

cludes among its power tools a 13 in. swing lathe, a double wheel grinder and 20 in. vertical drill. The other contains the refrigeration machinery, which serves the refrigerated cargo holds.

Crew accommodation has been given special attention and accommodation is provided for the following personnel: 11 officers, 4 passengers, 14 second class crew and 20 crew and in addition there is an owner's suite and pilot's cabin. Officers and second class crew are accommodated amidships and crew aft, an arrangement particularly suited to the owners' service. Cabins are all spacious and well appointed with mechanical ventilation throughout, supplemented by bracket type, variable speed oscillating fans. Heating throughout the accommodation is provided by electric radiators of the convection type, which serve the dual purpose of circulating the air in the room in addition to providing warmth. All outside walls are insulated for comfort in hot climates. All officers' rooms have hot and cold fresh water supply. The combined smoking and dining room is extremely attractive, being panelled in polished Canadian birch relieved by large mirrors. A folding partition separates the two rooms when desired. All furniture was manufactured in the builders' shipyard and is of mahogany or Canadian birch polished to match the decorative scheme of various grades of accommodation.

Navigation equipment on the ship is complete and comprehensive and the inside of the wheelhouse is painted light green to avoid eye glare in the tropics. Equipment includes gyro compass, repeaters and gyro pilot equipment and a 12-in. screen radar, in addition to wireless telegraphy, direction finding and echo sounding equipment. Telephone communication is provided between all senior officers, bridge, engine room, steering positions and forecastle, thus permitting the transmission of orders with a minimum amount of effort.

List of Equipment

MAIN ENGINES

Main Engine—6-cyl., 4275 bhp. at 160 rpm., Nordberg.
Governor—Woodward.
Lube and fuel oil purifiers—De Laval.
Main Air Compressors—Ingersoll-Rand.
Coolers and Heat Exchangers—Struthers Wells.
Fuel Oil Filters—Nugent.
Fuel Injection Equipment—American Bosch.
Scavenging Blower—Roots-Connorsville.
Air Intake Silencer—Maxim.

AUXILIARY ENGINES

Auxiliary Engines—Three 4-cycle, 8-cyl. diesels rated at 580 hp. at 600 rpm. Nordberg.
Emergency Generator and Compressor—Vivian.
Governors—Woodward.
Turbocharger—Elliott.
Fuel Injection Equipment—Bendix-Scintilla.
Air Filter-Silencers—Air Maze.
Mufflers—Maxim.

HIGH ALTITUDE DIESELS

By JAMES JOSEPH

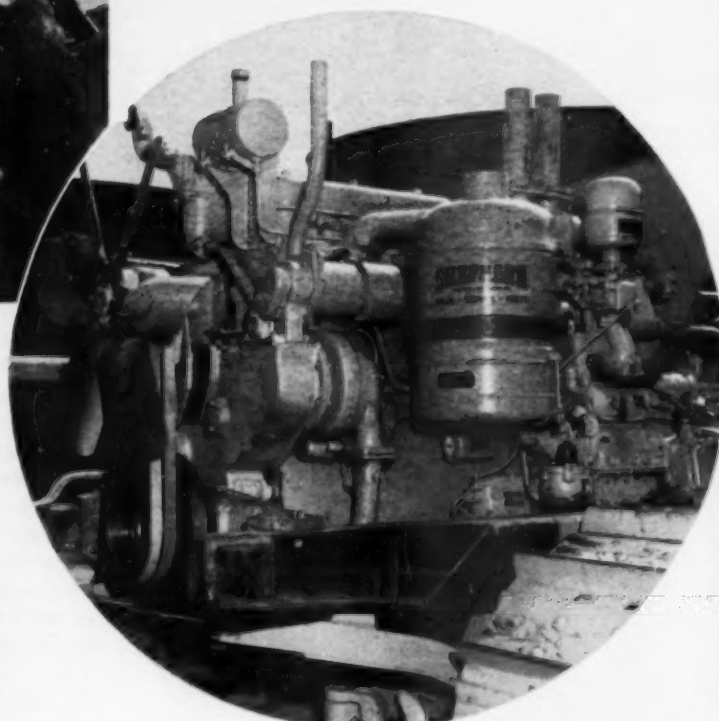


Twin stacks identify this Caterpillar as a converted unit for pushing a heavy load at high altitudes.

FIVE Caterpillar D-8 pushers are "breathing" easy despite the rarified air at 7600-ft. as they begin work on what will one day be a 4234-ft. long, 160-ft. high earthfill dam—a dam that will store 125,000 acre feet of additional water for six Edison Company Big Creek-San Joaquin River stations.

For such high altitude work, the Caterpillar diesel tractors are especially outfitted with a relatively new horsepower-booster kit. The kit allows the D-8s to operate with sea level efficiency even at 7000-8000 ft. Although field statistics are still being studied, indications are that the tractors work at high efficiency. This is contrary to some engineering claims that diesel engines lose 2% efficiency for each thousand-feet above sea level. This diesel "first" is at Southern California Edison Company's Vermilion Valley dam in Fresno county, which will restrain the waters of Mono Creek. The proposed reservoir's water will be held in storage to regulate Mono Creek's runoff, and to provide hold-over storage for extremely dry years, thus increasing hydro and irrigation supplies when needed most. The electric utility expects to gain about 122 million kilowatt hours annually and as much as 450 million kh. in extremely dry years when Mono Creek water is shunted through its existing Big Creek hydro-stations. When Bechtel Corp. was awarded the dam-building contract, a number of high-altitude operational problems had to be faced. These led directly to the use of booster-kit equipped D-8s. The mountain area's short season (about 5 or 6 months) coupled with the use of D-8s as pushers working with DW-20 scraper-units, motivated the search for maximum power. Happily, Los Angeles' Shepherd Tractor and Equipment

A special booster kit, designed and installed by Shepherd Tractor & Equipment Company, converts this diesel to a higher rate of efficiency for working higher altitudes—shown here without engine cover.



Company has been experimenting with D-8 high-output kits since 1949. As conceived originally, the kits were designed to up a standard D-8 from its rated 130 draw bar horsepower and 148 belt horsepower, to 163 and 180 horsepower respectively. Most early applications involved getting more power from the standard tractor, as operated under normal construction conditions. But with the Vermilion Valley dam projects, Shepherd and Bechtel engineers conceived the idea of adapting the booster-kit to overcome power deficiencies at high elevations. It was hoped that conversion would give tractors at rarified altitudes the same power as the standard, non-kit equipped unit at sea level. It is now becoming evident that the kit actually boosts power—even at the 7000-8000-ft. level.

Rarified air was a main problem. Lower atmospheric pressure meant a reduction of air volume to cylinders. Less air, thus less oxygen, posed the problem of sufficient initial heat for efficient combustion. Since the diesels start on heat of compression,

it was evident that thinner air and less oxygen per volume, meant less compression, so engines would work colder, at least initially. Lower oxygen content likewise raised the question of how much fuel should be fed to the cylinders. The power-boosting kit, developed by Shepherd, and called a "High-Output" conversion, proved the solution to these varied problems. Since installation of the first "High-Output" conversion in 1949, Shepherd has placed about 400 of the kits, and Shepherd engineers point out that there is no engine strain involved. The D-8's large, heavy-duty, 4-cycle, 1246-cu. inch engine easily puts out its 148 maximum brake horsepower with normal factory settings. And although the conversion kit ups this power output by 23%—to 180-182 brake horsepower—this is still

a conservative rating for so large and husky an engine. Now, for the first time, Shepherd discloses exactly how conversions are made.

To achieve 180-182 horsepower, engine speed is increased to 1325 no load and to 1200 full load rpm. This requires special governor mechanisms. Fuel pumps are also reset. Higher rpm's develop torsional vibration which is absorbed in the conversion by a vibration damper. And to provide clearance, the radiator and radiator fan are moved forward about 1 3/4-inches by redrilling the radiator support and installing a spacer between the fan bracket and timing gear housing. Easier breathing in so rarified an operation comes through installation of a larger air cleaner and twin exhaust stacks which replace the single, standard-model stack. A "Y" arrangement reduces back pressure, and gives a cooler exhaust. Currently available are three "High Output" kits—(1) Kit #M-48 for D-8s Serial Nos. 2U9662 and up; (2) Kit #M-49 for Serial

Nos. 2U7189 to 2U9661; (3) Kit #M-50 for D-8s Serial Nos. 1H6852 to 2U7188. Materials for the M-48 kit are price-tagged \$400-450.

Most materials for the kits are either modified Caterpillar parts or special parts fabricated by Shepherd. They may be either Shepherd-installed or field-installed by the user. As examples of modifications: (1) oil lines have been extended approximately 1 3/4-inches, the extensions welded to standard Caterpillar oil lines of the D-8; (2) water lines have been similarly extended; (3) dual exhaust stacks, tied together, are welded to a common plate; (4) a supporting block is provided for the extended fan assembly; (5) standard D-8 flyball has been machined down to about 3/4ths its original weight; (6) a larger, "Y" connected pre-cleaner is provided. There are numerous other modifications—since the kit's parts list is lengthy—but these are typical. Field-installation instructions are compact, straight-forward, and are indicative of what's involved. Shepherd's instructions for installing a

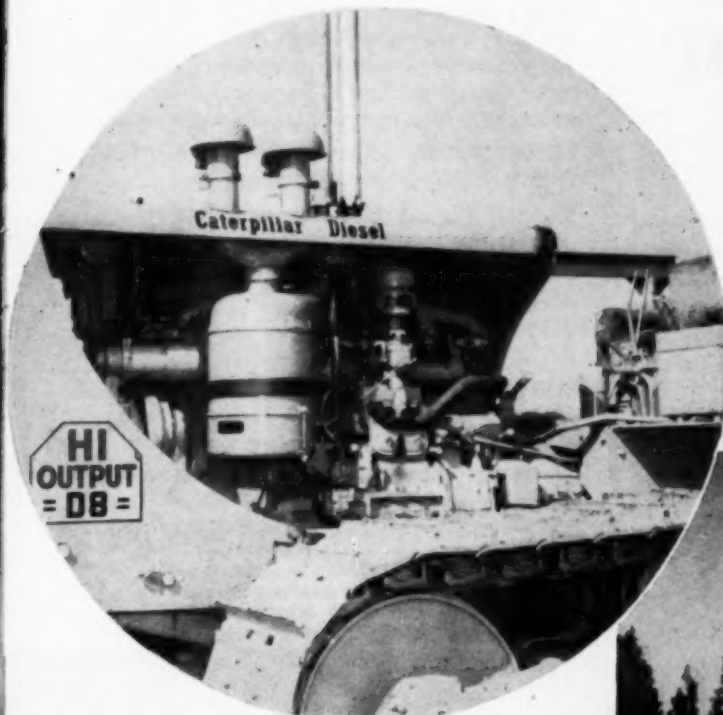
intake and exhaust manifold assembly and disassemble intake manifold. Install 4B2382X elbow assembly. Reassemble intake manifold and install complete manifold assemblies on engine. Install the air cleaner, using the air cleaner adapter plate and gasket. Install 6F7074 air cleaner bracket with band, felt, using bolt and pins. Install M54 air cleaner mounting bracket between the bracket assembly and the water jacket clean out plate upper cap screw, using shims supplied to support the air cleaner. Fill radiator to proper level and check for water leaks." There are also a number of fuel rack and governor settings—including the upping by .203 of the standard, recommended fuel injection rack setting. This setting produces approx. 182.25 engine horsepower at 1200 rpm. The conversion is completed by these final Shepherd instructions:

"Weld filler plates in hood assembly and install hood with extension supplied. Locate exhaust extension adapter and cut clearance in hood assembly to fit. Locate M55 pre-cleaner 'Y' assembly and

cut new outlet hole in hood. Install 'Y' assembly and M56 exhaust adapter. Reinstall exhaust extensions. Reinstall pre-cleaner removed and the new pre-cleaner supplied with cut. Cut the bearing area from the 8F66 bracket in top starting crank assembly. Weld the M57 tube which is part of the top starting crank supplied with the kit to the 1F4164 cover. Assemble the bearing portion of the 8F66 bracket, washer and spring on 8F71 shaft assembly and fasten 1F4164 cover to which has been welded the tube, by means of the cap screws. With this assembly installed on the starting crank housing assembly, align the shaft in a vertical position so that it does not bind. Trim the M53 air cleaner adapter plate so that the tube which has been welded to the 1F4164 cover can be welded to the air cleaner adapter plate in proper alignment."

Some other points worth stressing are: the D-8's modified engine runs smoothly, the criticals set up by higher rpms. are balanced out by the vibration damper. Damper is installed on the front end of the crankshaft; and equally interesting is the fact that the standard 1246 cu. in. engine now has an increased air intake, a ratio increase from 10 to 12.

Also, because of manifold modifications and increased air cleaner size, there's more heat in the exhaust manifold. That's the reason for twin stacks—which have become a kind of conversion identifier and trademark. Twin exhaust stacks dissipate hot gases faster, can handle larger volumes. Also, enlarging the precombustion orifice by 230/1000th inch changes the spray pattern. Some of the sea level conversions have slightly larger fuel injection pumps. However, D-8s working the Vermilion Valley retain standard pumps due to lack of oxygen.

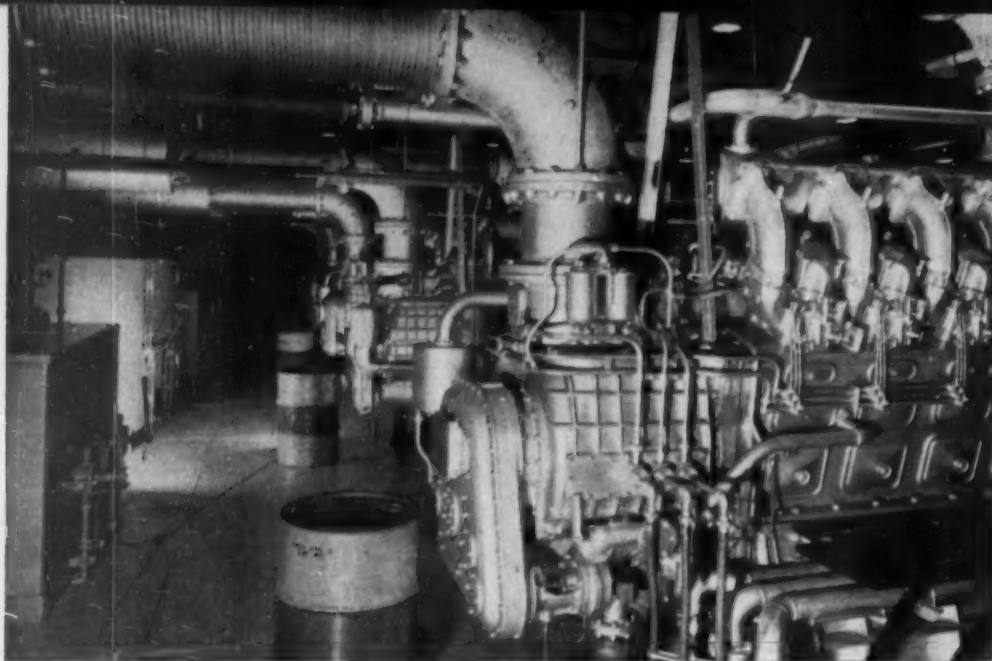


Caterpillar, converted and assembled, shows the stacks in pairs, a characteristic feature of converted units because of manifold modifications.

Caterpillars up front with an International working in the background—all producing at high efficiency, in rarified, 700-ft. atmosphere.

D-8 with a #M-48 kit are: "Remove exhaust stack, pre-cleaner, engine hood, radiator guard (including complete radiator assembly). Remove fan and hub assembly, crankshaft pulley, front motor support and timing gear cover. Remove governor weights and install 2-5F1585X governor balls (numbers refer to kit part number, in this case a standard Caterpillar part, modified by Shepherd). Remove precombustion chambers, rework orifices and reinstall. Install timing gear case and front motor support. Install fan assembly using the M52 fan spacer and studs. Install crankshaft pulley hub (5F2427) with plate assembly and weight assembly on rear of hub flange. Mount the pulley on the forward face of the hub. Install fan belts and adjust. Remove oil cooler lines from lube oil filter housing and install 8F6187X tube assembly. Weld an extension plate to the radiator guard as required and relocate radiator guard mounting holes. Install radiator guard and support assembly which includes radiator, using pipe and upper elbow assemblies. Remove





Blower end of the engines showing the Briggs lube oil clarifiers and the fuel oil day tanks. Lubrication oil used throughout the plant is Texaco Ursa. Titeflex and Flexonics hose connections.

NARRAGANSETT ELECTRIC COMPANY

THE Narragansett Electric Company of Providence, Rhode Island, is one of the firms which is part of the New England Electric System, supplying electricity to sections of Rhode Island, Massachusetts, New Hampshire, Connecticut and Vermont. Recently, Narragansett Electric added a new

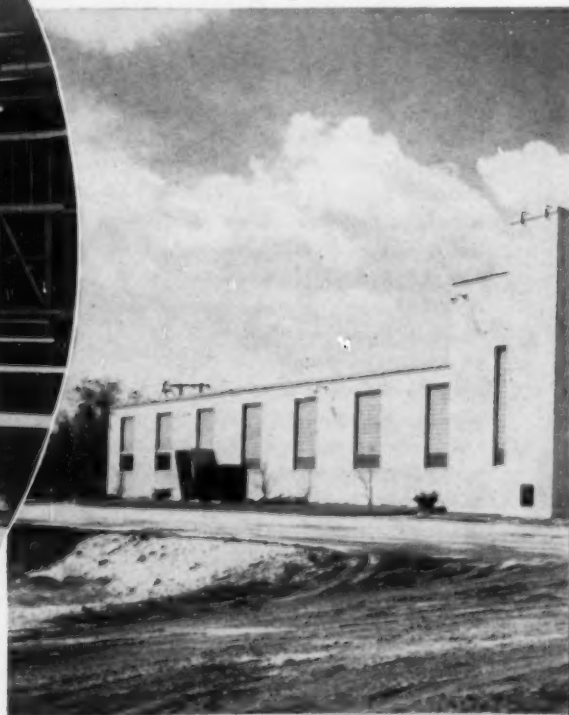
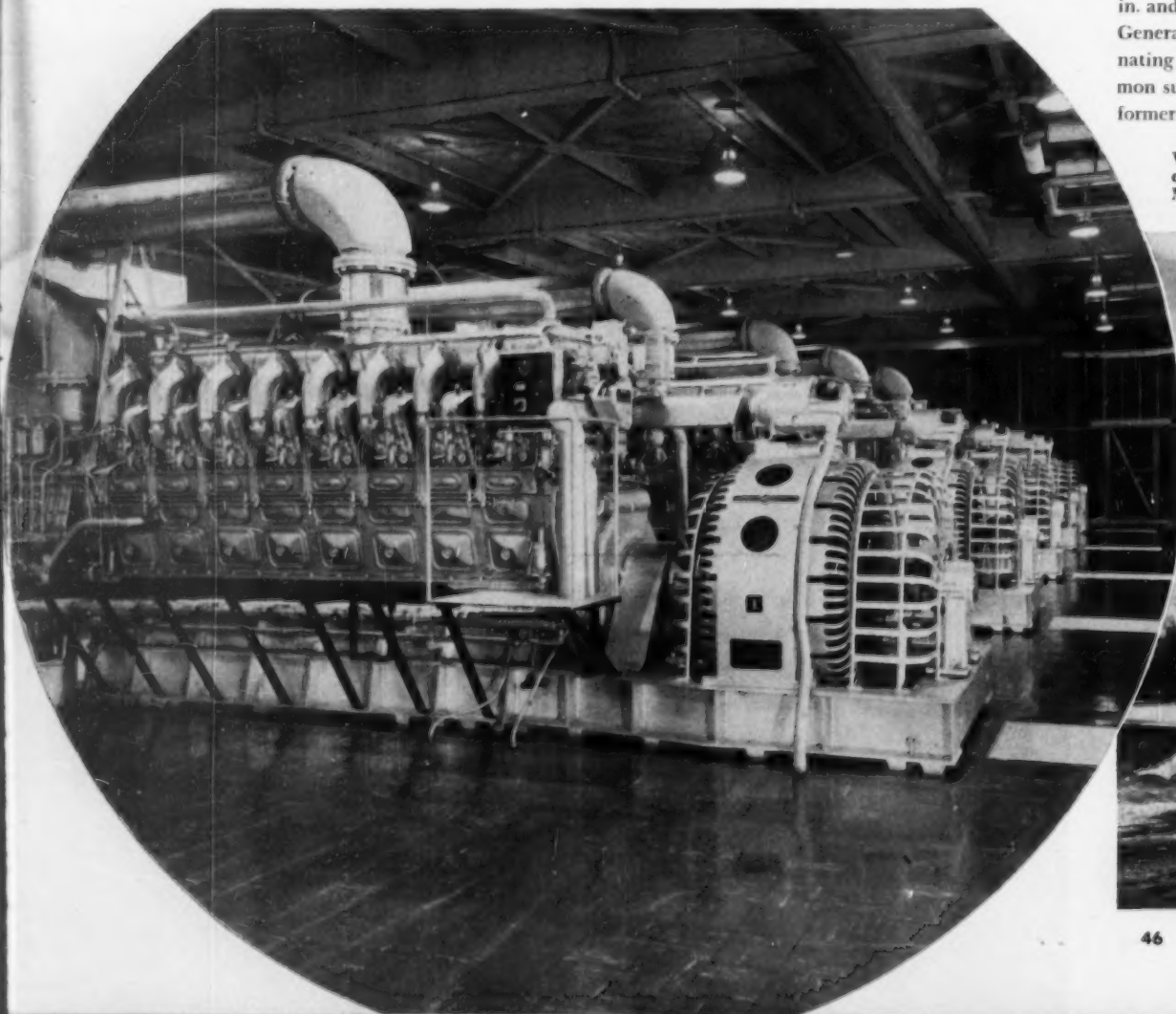
link in its power production, a diesel generating plant. This plant, which was placed in operation in 1952, is located in Hopkinton, R.I., and was designed to provide power for peak loads or emergencies. Although it has been in service only a short time, its performance has well justified the decision

of the management to make the installation. Engineering and construction was under the direction of the New England Power Service Company with C. A. Maguire and Associates of Providence and Boston acting as design agents.

The station building is an attractive, single story, flat-roofed structure. Both the exterior and interior walls are of buff salt glazed tile. Large glass block window areas provide excellent interior lighting during daylight hours. The floor is concrete, covered with oil and chemical resistant asphalt tile except for the pipe pits which are equipped with removable steel cover plates. Each engine and generator sub-base is supported on vibration dampeners which rest on a re-inforced concrete foundation about 21 ft. long, six ft. wide and 7 ft. deep. All water, lubricating oil and fuel piping for the engines are located in pits beneath the floor level. A traveling overhead hoist is provided for lifting large engine parts. All moving parts are covered by safety guards. All hot piping is insulated wherever there is danger of contact by personnel. An extremely comfortable structure for the operating personnel, the building provides excellent ventilation by means of centrifugal exhaust fans; heating in the winter is provided by an oil fired boiler and vertical projection type unit heaters; and a sound proof office from which the main floor is visible through double windows is also provided.

Five GM Cleveland Division Model 16-278A diesels with Marquette governors furnish the motive power for the five 1000 kw. generators. A 10 kw., direct-current exciter is mounted on top of each generator and is driven through a drive-shaft from the engine gear train. The 2-cycle, 16-cylinder engines have a bore of 8¾ in. and a stroke of 10½ in. and are operated at 720 rpm. The generators are General Electric 4160-volt, 3-phase, 60-cycle alternating current units and are mounted on a common sub-base with the engine. Main leads to transformers are underground cables in transite conduit.

View along the generator end of the engines. The diesels are GM Cleveland Model 16-278A, each driving a 1000 kw. General Electric generator.



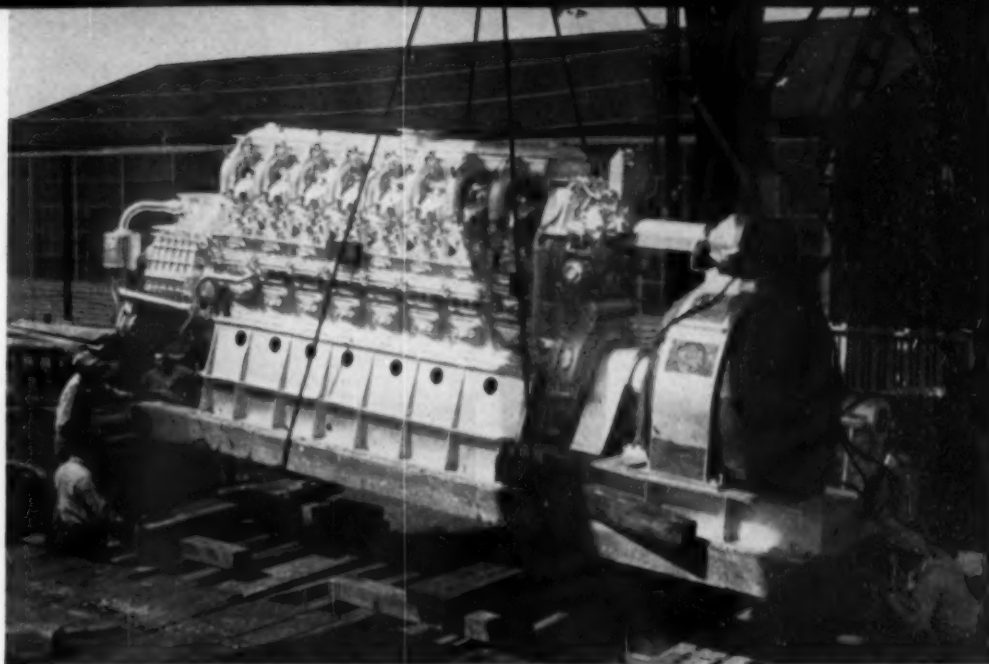
Fuel oil for the engines is stored in two 100,000 gallon tanks near the building. Electrically-driven pumps of 50 gpm. capacity transfer the fuel from the main storage tanks via underground pipes and through a Cuno fuel oil strainer and a Briggs fuel filter, to the 500 gallon day tanks located near the blower end of each engine. Lubricating oil for each engine is stored in a combination Briggs clarifier and a storage tank which is located near the fuel day tank. Both the lube oil strainers and filters are Briggs. The oil storage capacity of each of the units is approximately 175 gallons. The engine pressure pump draws clean oil from the clarifier storage space at the rate of 110 gallons per minute, forces it through the lubricating oil cooler and delivers it to the engine inlet. The engine scavenging pump draws hot oil from the engine pan at a rate of 155 gallons per minute and delivers it to the clarifier where it passes through the strainers and filters into the clean oil storage space.

The engine cooling system is the fresh water closed type. The engine water pump forces fresh water at the rate of 360 gpm. up through the engine system and the water jacket of the exhaust manifold and then to the Ross water cooler. At this point, the water is either passed through the cooler or partly diverted around it by means of an automatic temperature regulating valve. This valve is controlled by means of a thermostatic bulb located in the water discharge passage at the engine. All the water then passes through the lubricating oil cooler and back to the suction side of the water pump where it is recirculated. The fresh water is cooled in the water cooler by raw water pumped from a nearby river.

Starting is accomplished by means of an Ingersoll-Rand air compressor which delivers the air at 425 psi. which is conducted directly into the engine cylinders. Air is stored in special high pressure

Interior view of the station looking toward the office. The generator control switchgear and station service switchboard are to the left.

Exterior view of Hopkinton Station.



Unloading one of the GM Cleveland diesels from a flat-car for the Narragansett Electric Company plant at Hopkinton, R.I. Marquette governors on all engines.

tanks inside the building. The scavenging air for the engines is drawn by the engine blowers from the outside of the building through a large combination Air Maze cleaner and intake silencer. A second Air Maze silencer is located inside the building in the suction line. The engine exhaust is piped to the outside where it passes through a vertical silencer and stack.

List of Equipment

Engines—Five GM Cleveland diesels, Model 16-278A, with Marquette governors; 2-cycle, 16 cylinder, 8 $\frac{3}{4}$ x 10 in., 720 rpm.

Generators—Five General Electric 1,000 kw., 4160 v., 3-phase, 60-cycle, ac.; and five GE 10 kw., dc. exciters.

Governors—Five Marquette.

Jacket water and lubricating oil coolers—Ross.

Lubricating oil—Texaco Ursa.

Lubricating oil sump tank and clarifiers—Briggs.

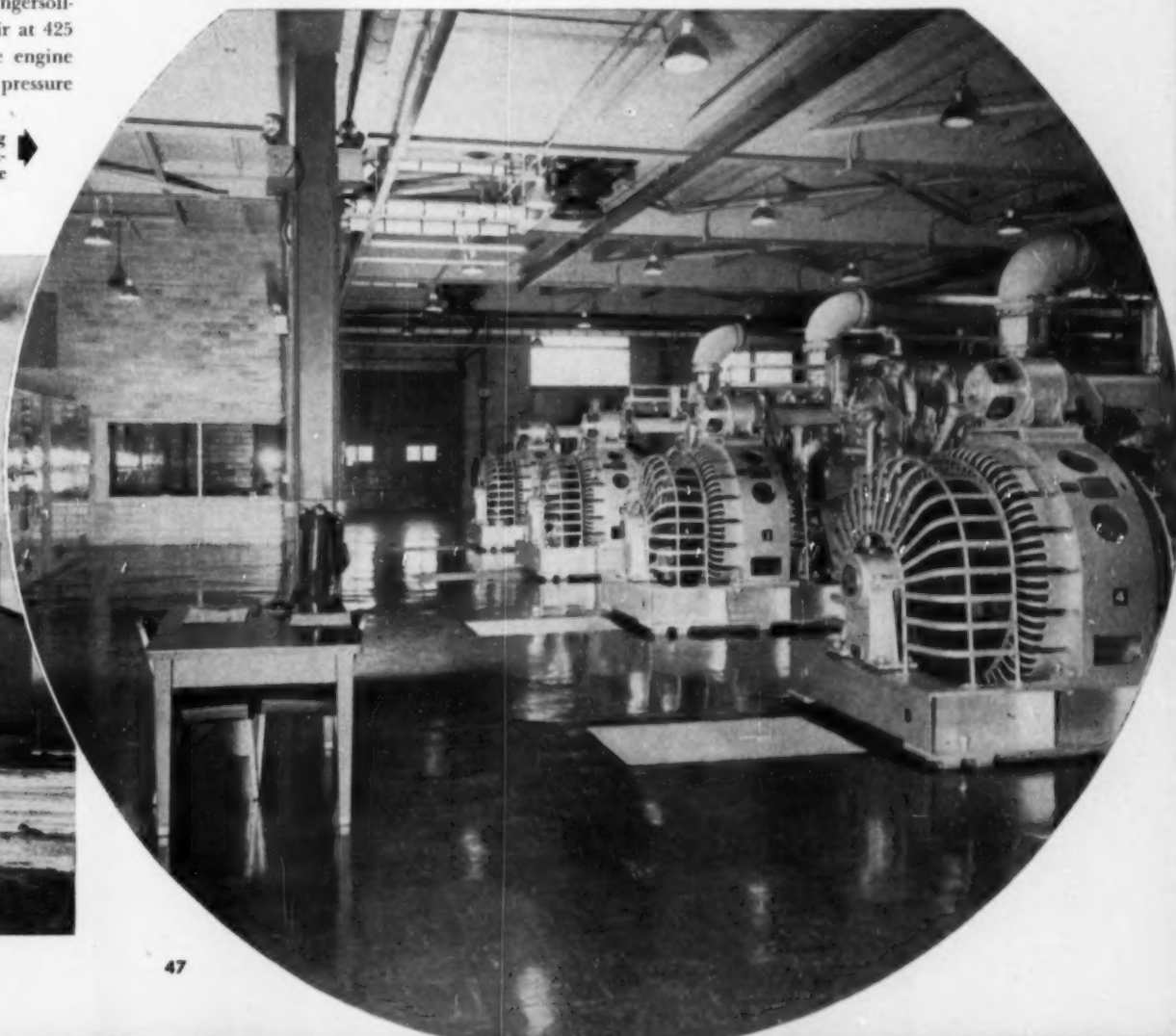
Oil bath and intake filters—American Air Filter Company.

Starting air compressors—Ingersoll-Rand.

Hose connections—Flexonic; Titeflex.

Air filter and combination intake silencer—Air Maze.

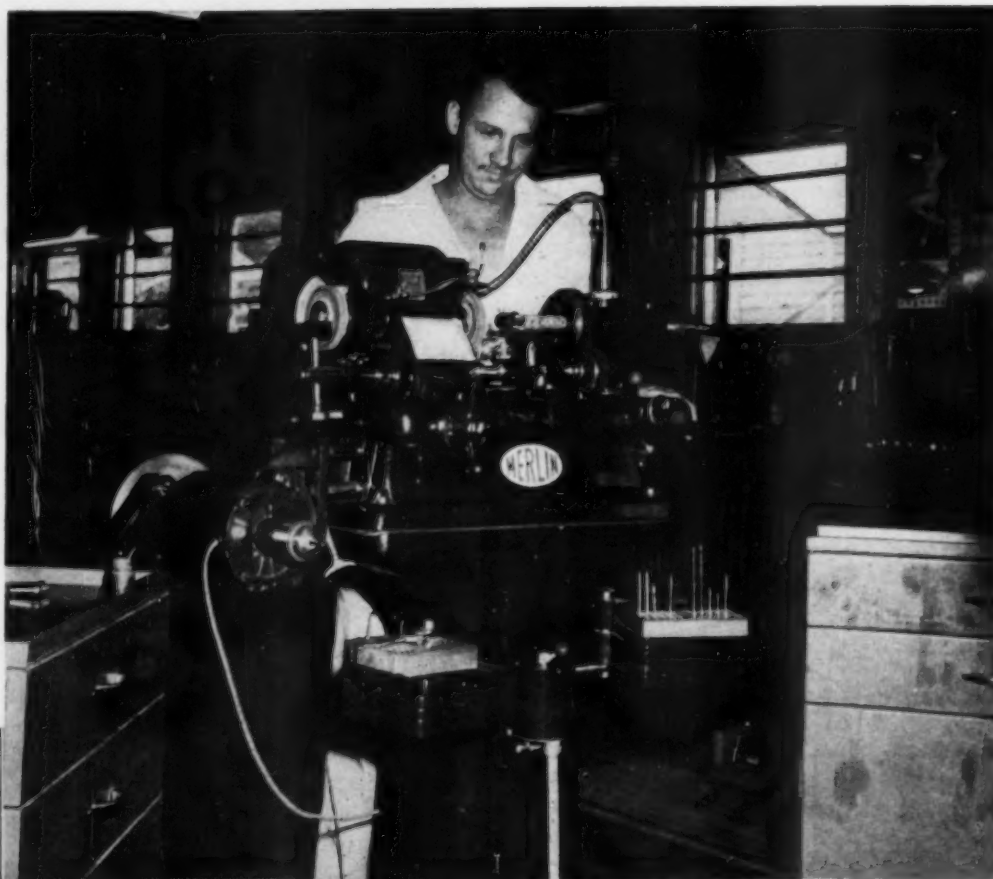
Mufflers—Engineering Specialties Company.



DIESEL overhaul, insofar as the engine itself is concerned, requires only the equipment and special skills which the operators have acquired in attaining their positions as engineers, master mechanics, or supervisors of motive power. But the specialized equipment which sets the diesel apart from other types of internal combustion engines, the fuel pump and the fuel injection system, are units which require precision tools and a degree of craftsmanship which are not usually found on the job. To fill the need for this type of maintenance there have been developed plants which do no engine work, and which may be at quite a distance from the plants in which the diesels operate, but to which the pumps, nozzles and injectors can be shipped for corrective maintenance.

One such specialized plant is the Magneto and Diesel Injector Service of 6931 Navigation, Houston. This company receives worn, carbonized fuel injection units and fuel pumps in need of servicing, and reconditions them on machines especially designed for this work, among the specialized tools being a Merlin Servicemaster, a machine equipped with dual spindles and a multiple tool post for reconditioning nozzles to the manufacturers' specifications. A second stand provides for either individual or set testing of injectors and nozzles to determine the amount of fuel passed by them over a single cycle, or over a given period of operation under standard conditions. Fuel pumps, of the multiple types, are also tested on a special

SPECIALIZED SERVICES IMPROVE DIESEL OUTPUT



A. B. Ingram stands behind Merlin Servicemaster, English importation for reconditioning nozzles and fuel injection systems. The machine is equipped to rework units to exact manufacturer's original specifications. The metal cabinets flanking the machine contain auxiliary equipment required for each type of nozzle.



William H. Krommes begins dismantling a magneto on the specially equipped bench. At right is a unit for testing and calibrating the magneto after overhaul.

Precision Reconditioning of High Tolerance Diesel Fuel Injection Equipment Assures Optimum Economy

By MICHAEL T. PATE



The American Bosch unit for testing multiple pumps, with variable speed unit at right. W. H. Krommes, the operator stands behind machine to give unobstructed view of the unit.

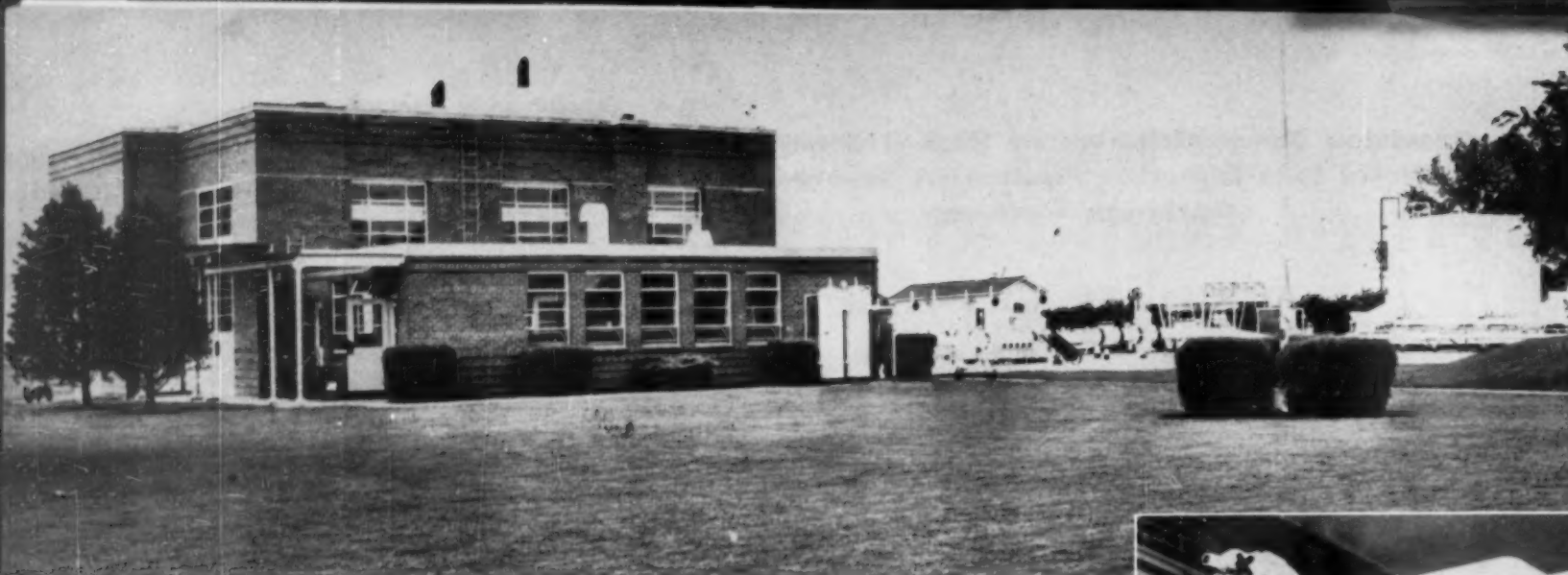
stand, where the output of the reconditioned unit can be tested against operating pressures and at normal speeds by means of a special gear box which provides any desired speed range.

Where reconditioned nozzles and other parts are to be stored for some time before re-use, or where the parts are destined for service in areas exposed to moist, salt air, a thermostatically controlled vat, in which a molten plastic is held at 400°F, provides a place where parts may be immersed in the plastic for a complete seal. The plastic contains an oil which, when the covering is torn off, leaves the metal with a thin film of protective oil. This is sufficient to protect the nozzle against possible contact with moisture while being assembled in the engine, and insures correct operation.

Magneto and Diesel Injector Service is an authorized service unit for American Bosch, Bendix Scintilla and Demco pumps and injectors; and for American Bosch, Fairbanks-Morse, Wico and Bendix Scintilla on magnetoes. They also undertake complete injector work on any diesel, and are especially equipped to undertake this reconditioning on GMC units. A stock of replacement parts for the types of diesel pumps and fuel injection systems serviced enables the replacement without delay of any parts found during the reconditioning operations to be too worn or otherwise unsuitable for replacement in service.



A. B. Ingram checks the fuel output of a set of nozzles after reconditioning on a special machine which was designed and built in their own plant. A sight feed checks flow while calibrated cylinders measure output over a time cycle.



Modern, well kept exterior of Shell Oil Company's Auburn, Illinois station on North Line. The new 1210 hp. Nordberg engines are installed at the Auburn and Sibley, Illinois stations.

SHELL PIPELINES TO THE FUTURE

**Advanced Design Uses "Component Blending" to
Feed Finished Products Directly Into The Line**

INCORPORATING the most modern concepts of products pipe line design, Shell Oil Company's new 14 inch Wood River carrier has set new standards of efficiency in its first 9 months of operation delivering finished products.

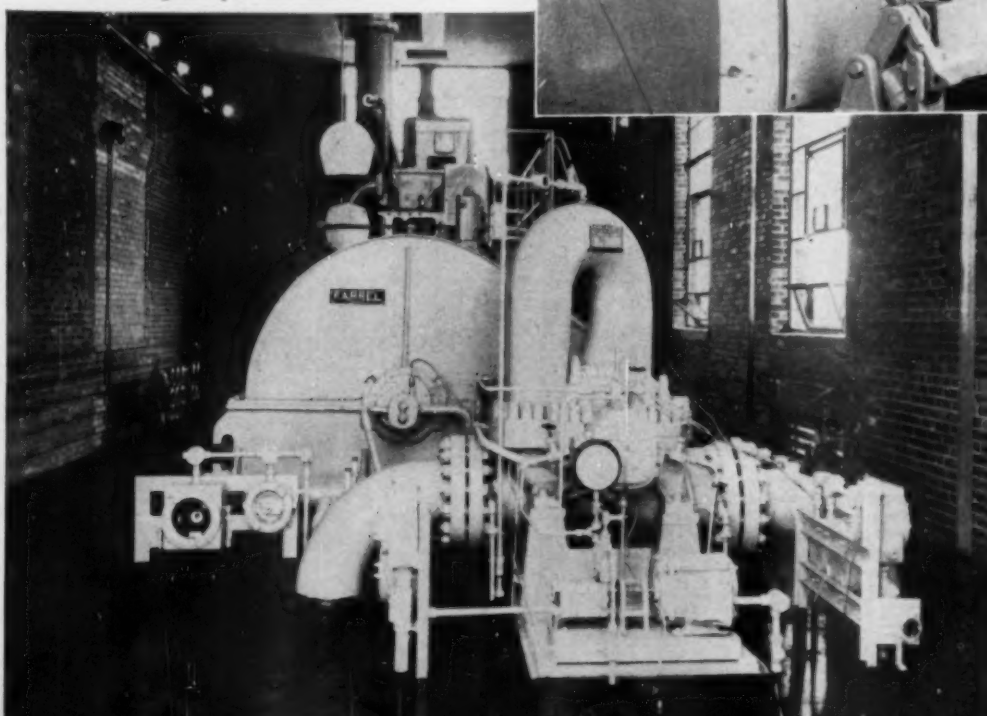
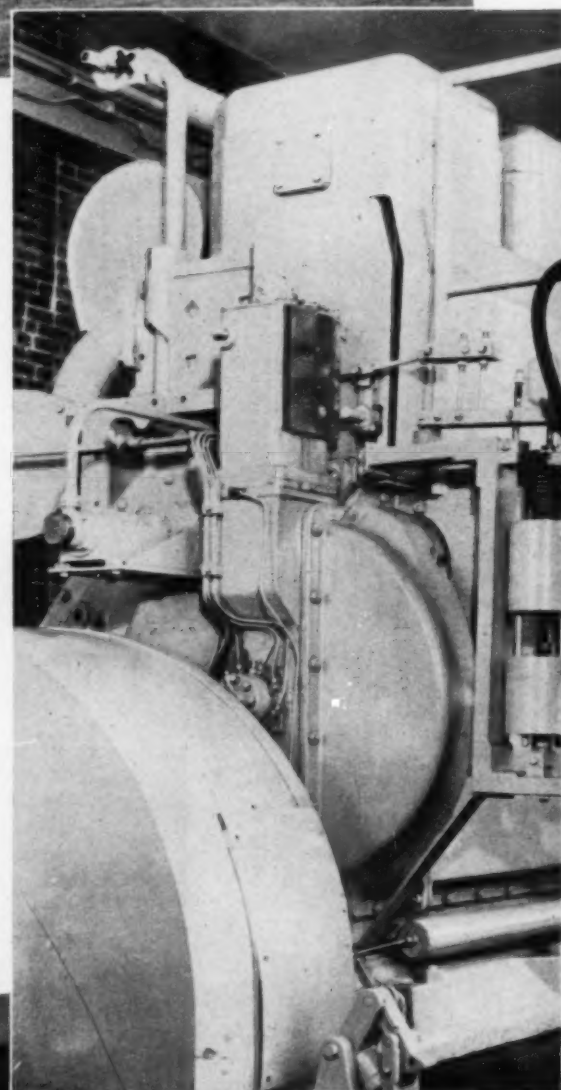
The new line, which runs 279 miles between the Wood River refinery and terminals at Argo, Illinois and East Chicago, Indiana replaces an 8 inch line which transported 34,000 bbls a day. The new line has an initial daily throughput capacity of 85,000 bbls and a future capacity of 120,000 bbls when the full complement of pumping facilities are installed. Power on the line is now furnished by two new 1210 hp. Nordberg supercharged diesel engines in stations at Auburn and Sibley, Illinois together with electric motor drives at the Wood River Station and the engine installations which powered the original systems. Construction of the new 14 inch carrier, which cost in excess of 10 million dollars, began in May 1952. It was laid parallel to the older 8 inch line with products, at times, running through segments of both 8 and 14 inch pipe to maintain continuous thruput. As each section was completed, the 8 inch pipe was removed and salvaged. The original line was laid in 1927 for transporting crude to Shell's former East Chicago refinery. With the expansion of Shell's Wood River refinery in 1940, the line was converted for products transportation. East Chicago, with its storage capacity of 2,500,000 bbls, now serves as a product terminal for the new Shell line.

The new prime movers in the Auburn and Sibley stations are Nordberg four-cycle, supercharged diesel engines with eight cylinders of 13 inch bore and 16½ inch stroke, rated 1210 hp. at 460 rpm. Each engine drives a two stage, horizontal split case, centrifugal pipe line pump through a speed increaser with a ratio of 1:8.205. The pumps have a rated capacity of 4160 barrels per hour. Each is equipped

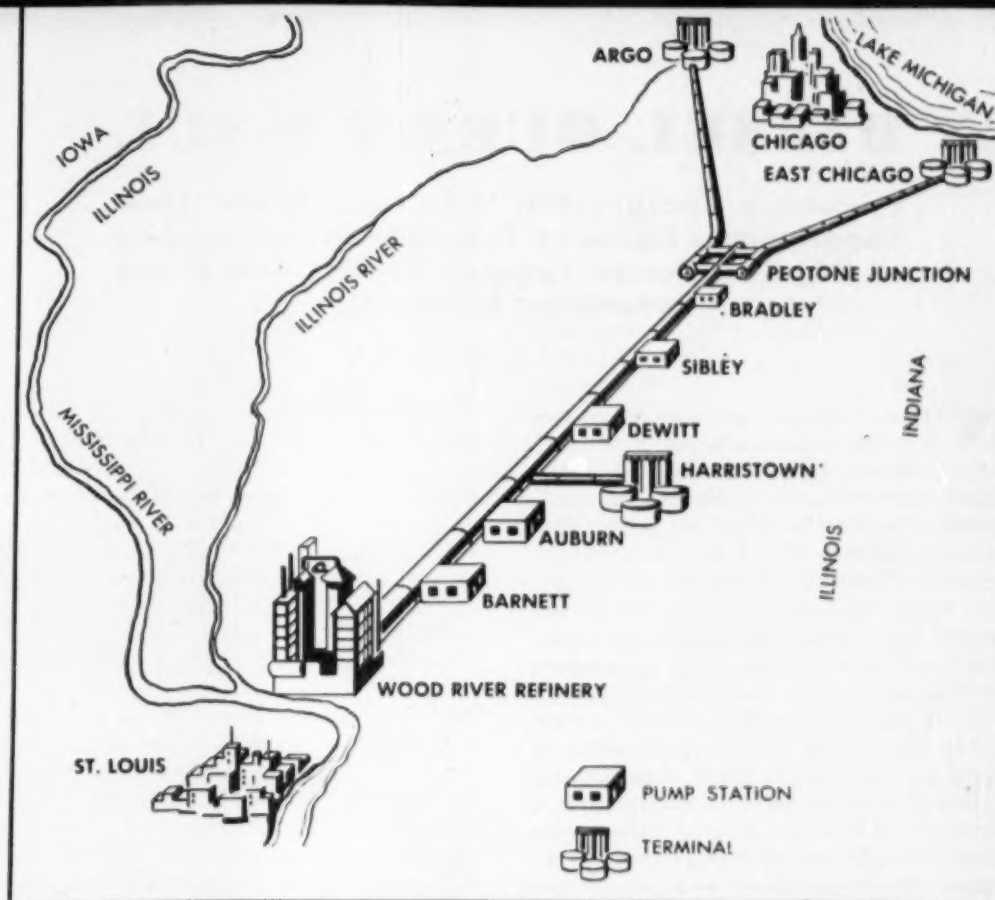
with double mechanical seals with separate seal oil circulating pump. The Nordberg engine at Auburn, as well as at Sibley, is set up in series with an 810 hp. Alco engine. These Alco units, in addition to similar engines in stations at Barnett, DeWitt and Bradley, Illinois, were installed in 1947. Line pressure is established at 900 psi. and varies depending upon product and temperature. Currently, 22 products are being carried through the line with gasolines and fuel oils the principal products.

W. Mellenberger, chief operator of Shell Oil Company's Auburn, Illinois station adjusts a valve on the automatic starting system for the new 1210 hp. Nordberg supercharged diesel. Engine has Woodward governor, Chicago Metal Hose flexible connections.

Auburn, Illinois station houses the new 1210 hp. Nordberg supercharged pumping engine, a Byron Jackson two stage centrifugal pump and a Farrel Birmingham speed increaser.



The new Shell carrier is hydraulically balanced to maintain a constant pressure differential and assure maximum thrust. All-welded seamless steel pipe was used throughout the line. Wall thickness varies from .312 to .375 in. with the heavier pipe laid principally in the metropolitan areas. One of the many unique features of this new products line and other lines operated by Shell is the system whereby the products are dispatched via a teletype communications network from the New York office. Teletypes at the main office, pumping stations and terminal points are in continuous operation with line rates and products co-ordinated to predetermined schedules. Another salient point of opera-



Graphic illustration of Shell Oil Company's 14 inch Wood River carrier.

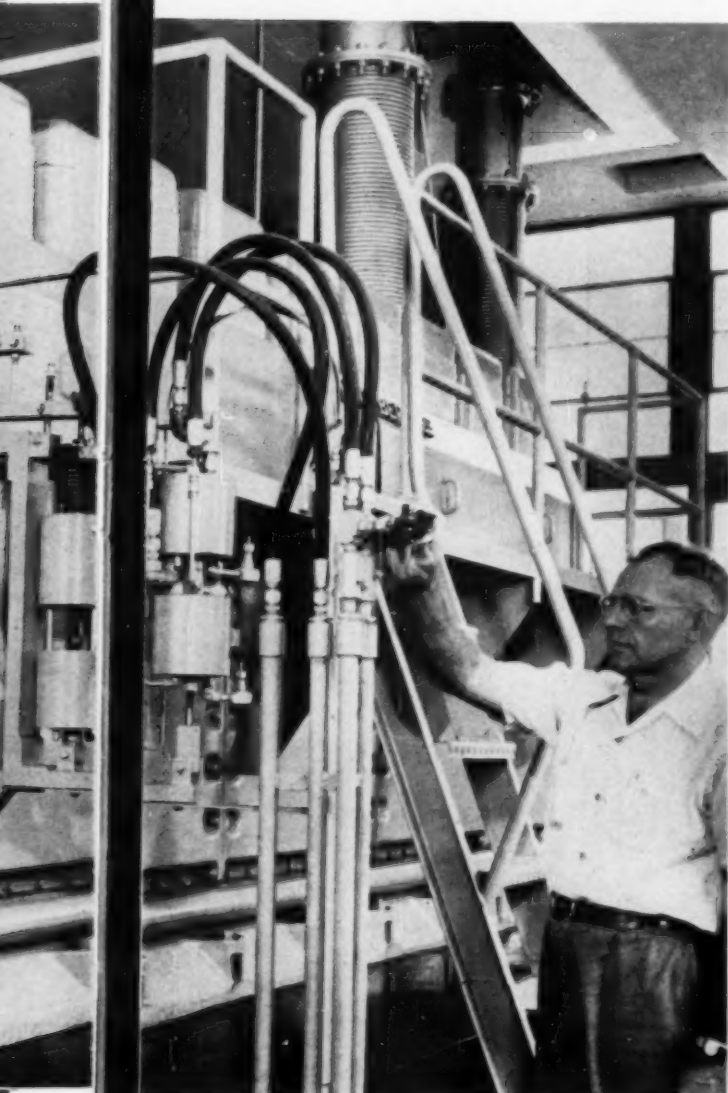
tion is the system developed for automatic starting and operation of the pumping units. This system utilizes the usual governor as an overspeed device only, with the primary control of the engine functioning through direct hydraulic cylinders which position the fuel racks in response to changes in station suction and discharge conditions. Air actuated cylinders provide the start and stop sequence. On a push button or automatic start, following the opening of the main pump valves and the establishment of pump seal oil and engine oil circulation, the start cylinder receives air through a solenoid valve, extending its piston to open the fuel rack wide at the same moment as starting air is

admitted to the engine. When the engine fires and differential pressure across the main pump increases, the solenoid valve to the idle cylinder opens, admitting air to retract the fuel rack to idle position. After a delay through an electric timer, the air is released at a controlled rate by means of a time tank, allowing the engine to transition from idle to control speed over a period of approximately five minutes. This multiple sequence insures time to warm up a cold engine and the gradual application of load.

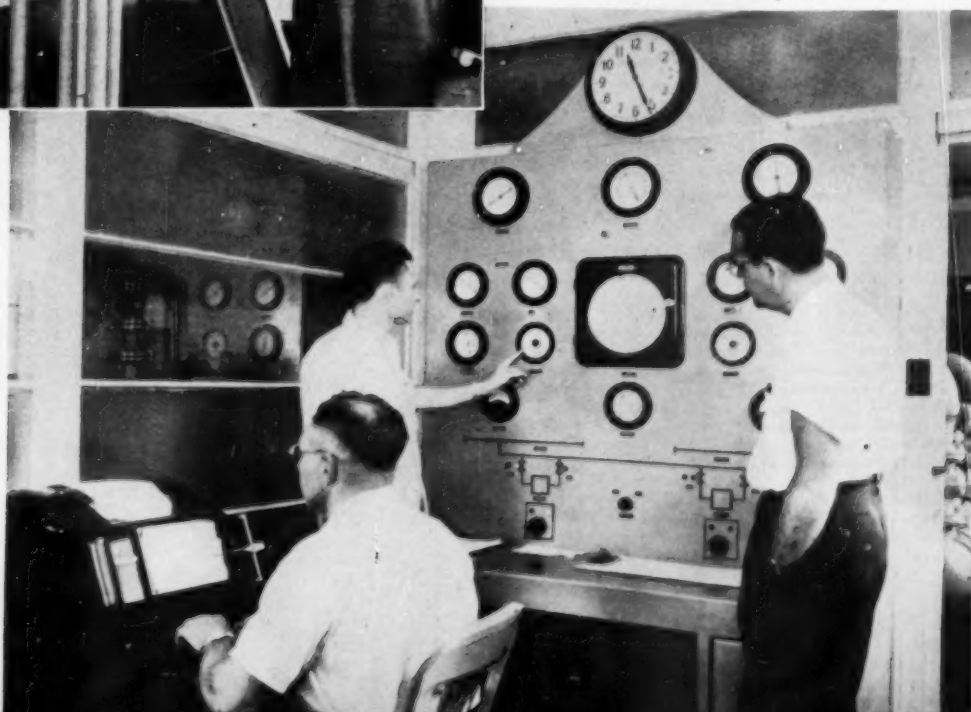
In these and several other aspects, the new line is a pipe line of the future. For the first time refinery base stocks will be blended into finished products as they enter the line. This will be accomplished by pumping gasoline component stocks through separate lines into a special "component blending" unit. This in turn feeds the finished products directly into the line with significant savings in time and tankage. This and other new features assure unreach standards of pipe line efficiency and safety and better finished products.

List of Equipment

Main Engine—Nordberg 1210 hp. supercharged four-cycle, eight cylinder, 13 in. x 16½ in.
 Pipe Line Pump—Byron Jackson.
 Speed Increaser—Farrell Birmingham.
 Governor—Woodward.
 Air Filter—Air-Maze.
 Air Silencer—Air-Maze.
 Lube Oil Cooler—Young Radiator.
 Cooling Water Radiator—Young Radiator.
 Exhaust Silencer—Maxim.
 Lube Purifier—Hilco.
 Injection System—Bendix Scintilla.
 Automatic Starting System—Shell Design.
 Flexible Exhaust Hose—Chicago Metal Hose.



Control room of the Auburn station with station chief W. Mellenberger at the teletype. W. J. Wagert (left), and G. D. Harden, divisional engineer and chief chemist respectively of the North Line at the panel.



DIESEL OCEAN HAUL

Crowley's Century-Old Tow Boat Know How Supplements Refinery Transportation Services of Big 7 to Power Logging Trucks and Wood Industries Efficiently

By F. HAL HIGGINS

NOT since the Gold Rush has the West grown so rapidly in population and in the industries, businesses, services and homes to equip, employ and house that population. The whole growth of the West in this war and post-war stage is being efficiently greased and powered by a growing and smoothly operating oil industry. But the Upper Northwest corner of this Western United States—Oregon, Washington and Idaho—has no oil fields and must bring its petroleum products from outside excess producing areas. A 569 mile pipe line from Salt Lake City to Pasco, Washington, carries over 6,000,000 barrels of diesel oil, stove oil, two grades of gasoline, and "alkylate" from the Standard of California refinery at Salt Lake City to seven delivery points before it reaches Pasco with the fuel to power the agricultural inland empire that spreads out from that Snake River point. Another pipe line will cross the mountains of Western Oregon from Medford to Crescent City on the Pacific soon. From the fantastic oil fields around Edmonton, Alberta, will soon come still another big pipe line to bring Canadian oil field products to the oil-hungry Northwestern United States. But at the present time, seaborne bulk fuel for the automotive power of the logging empire and its lesser farming and fishing industries is being supplied efficiently by a reborn ocean transport system with a fleet of tugs hauling oil barges to supplement the oil tankers of the seven major oil companies. United Towing Co., the modern service of the famed century-old San Francisco harbor tow boat operator, is used by all of the oil companies to supplement their own bulk oil sea-borne service.

At Crescent City, California, the storage plant of Oil Terminals Co. is used by all seven of the oil companies refining and selling oil field products in the West. The development of coastwise barge service, and the companion storage terminals are attributed to the efficiency, equipment, management and reputation of the Crowley family, pioneers in the water transportation field.

Over in San Francisco a seeker after information on water-borne bulk oil field products from the refineries on San Francisco Bay to the Northern California and Southern Oregon coast came to the offices of the famous Crowley line. The Crowley line of tug boat owners and operators goes way back to Gold Rush days with an accumulated know-how that covers steam to diesel engine power in moving anything on the waters of the Bay. The third generation of Crowley was absent when the writer made his second call after returning from a visit to the bar harbor bulk oil ports of Eureka, Crescent City and Coos Bay.

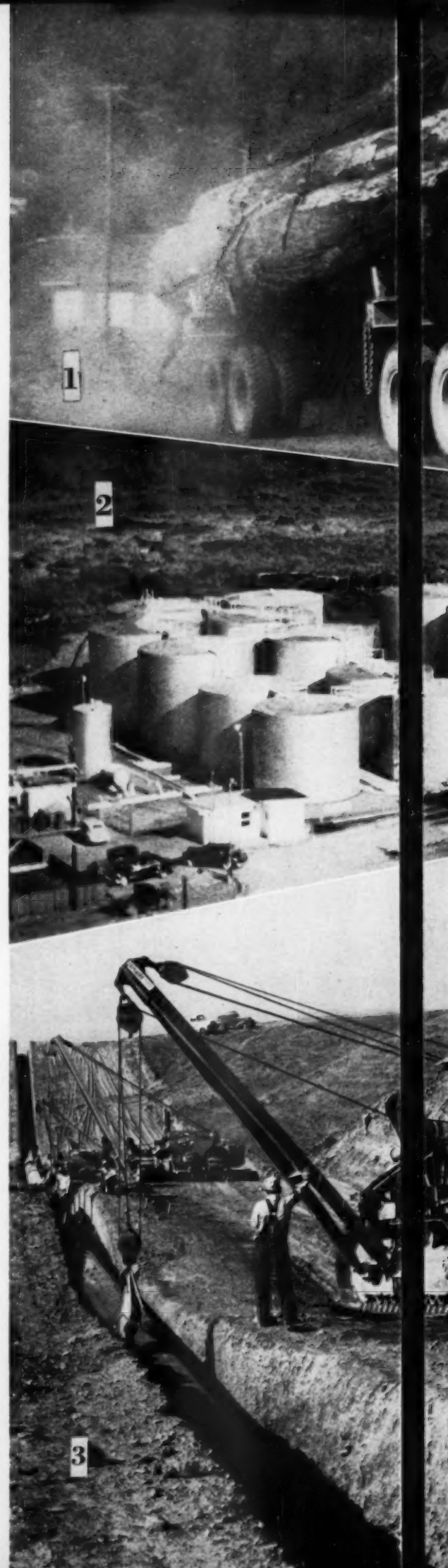
"The United Towing Co. was formed in 1939 to take over the inland water equipment of the Shell

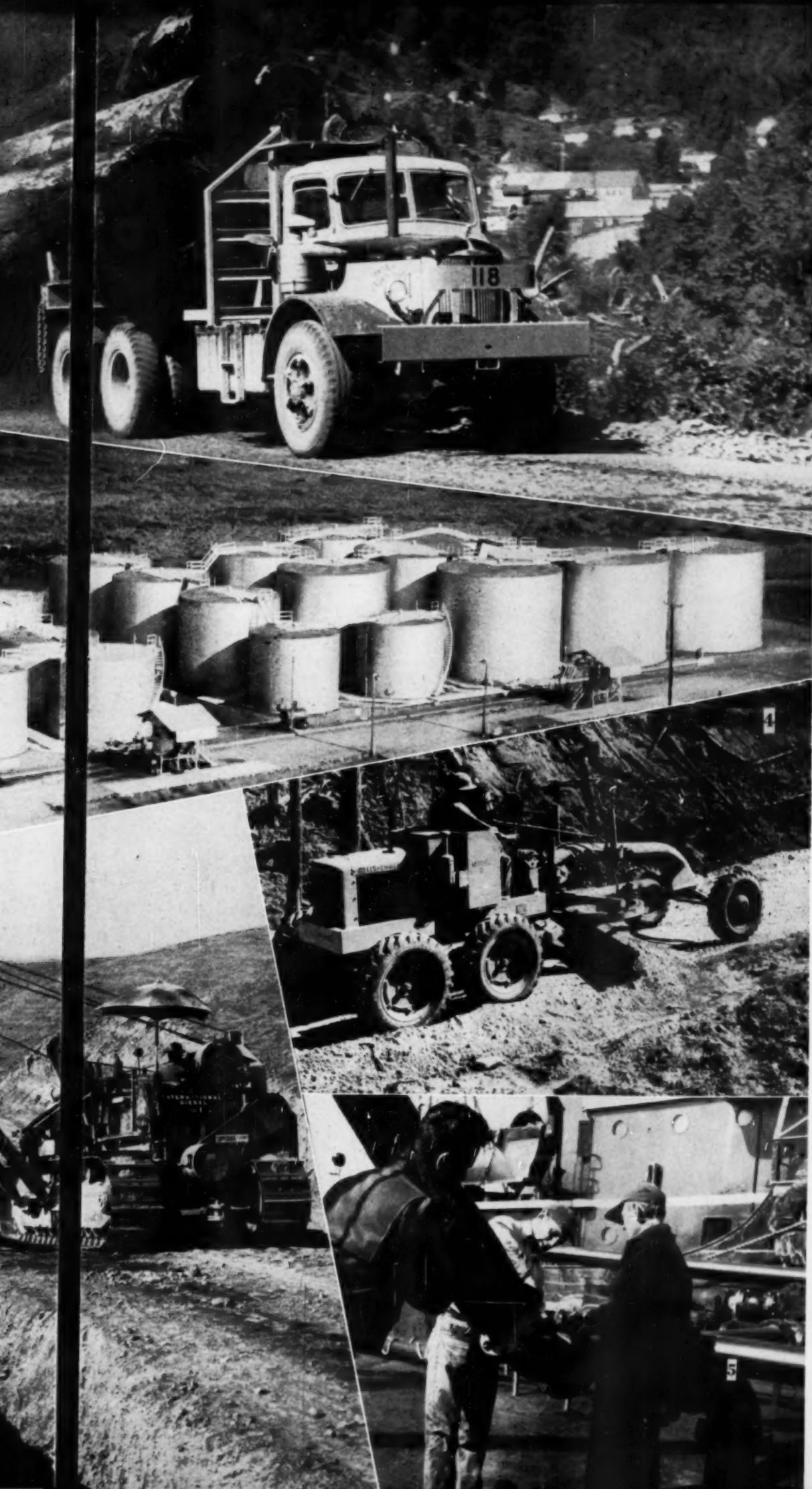
Oil Company," explained Manager, Mr. Robert Dyer, of United Towing Co. "In 1948 we started a coastal service from San Francisco to Coos Bay, Oregon. The single barge used in this service at that time was a 14,000 barrel capacity, towed by a tug, the *Sea Wolf*. The *Sea Wolf* was powered by a 1200 h.p. Enterprise diesel. By 1950 we designed and launched Barge No. 12 of 26,000 barrels capacity, which is built especially for sea service. Then the tug *Hercules* of Puget Sound Tug & Barge Company, Seattle, powered by a 1200 h.p. diesel engine, was employed to tow the barge. Barge No. 14, with the same capacity of 26,000 barrels, was launched and placed in service the following year—1951, and in 1952 Barge No. 15, with a capacity of 30,000 barrels, was launched and placed in service. The Red Stack tugs, *Sea Lion* and *Sea Ranger*, each powered by twin GMC 900 h.p. diesels, operating on the same shaft, are steadily employed in towing these barges. By August of this year Barge No. 16 will be ready for launching. It is the largest of the fleet, being 40,000 barrels capacity. All of the sea-going barges of this fleet are equipped with three pumps and three GMC pumping engines of 165 h.p. each.

"After building a pilot plant at Alviso, California, on San Francisco Bay, in 1948, with a capacity of four 5,000 barrel tanks, another two 8,000 barrel tanks were added to bring the Alviso tank capacity up to 36,000 barrels. By 1950, construction was started at Crescent City and that plant was opened for unloading and storage in March, 1951, with a total of 23 tanks of 156,000 barrels capacity. Two tanks, with a total of 8,000 barrels capacity, have since been added. All seven major oil companies selling to the public on the West Coast are represented in the storage of their bulk petroleum products here—Union, General Petroleum, Tide Water Associated, Texas Company, Richfield, Shell, and Standard of California. Each company is assigned separate tanks for storage of its products.

"During 1952 construction was started on an oil terminal at Eureka, California. This terminal was completed and opened for business on May 1, 1953, with eleven tanks of a total capacity of 66,000 barrels, and is used by General Petroleum, Richfield, Texas Company, and Tide Water Associated. Shell, Union, and Standard have their own terminal facilities at Eureka."

Fig. 1: One of 19 Mack trucks with Cummins diesels and Twin-Disc torque converters operated by the Hammond Lumber Co. in northern Calif. Fig. 2: Oil Terminal Co. storage plant at Crescent City, Calif. which serves all seven major oil companies selling in the Northwest. Fig. 3: Bechtel builds a giant pipeline with International diesel crawlers to supply oil products to the great Northwest. Fig. 4: A GM powered Allis-Chalmers grader maintains roads for truck logging. Fig. 5: The GM powered United Towing Co. tug *Sea Lion* prepares to unload its cargo of bulk diesel fuel, gasoline and stove oil at Crescent City.





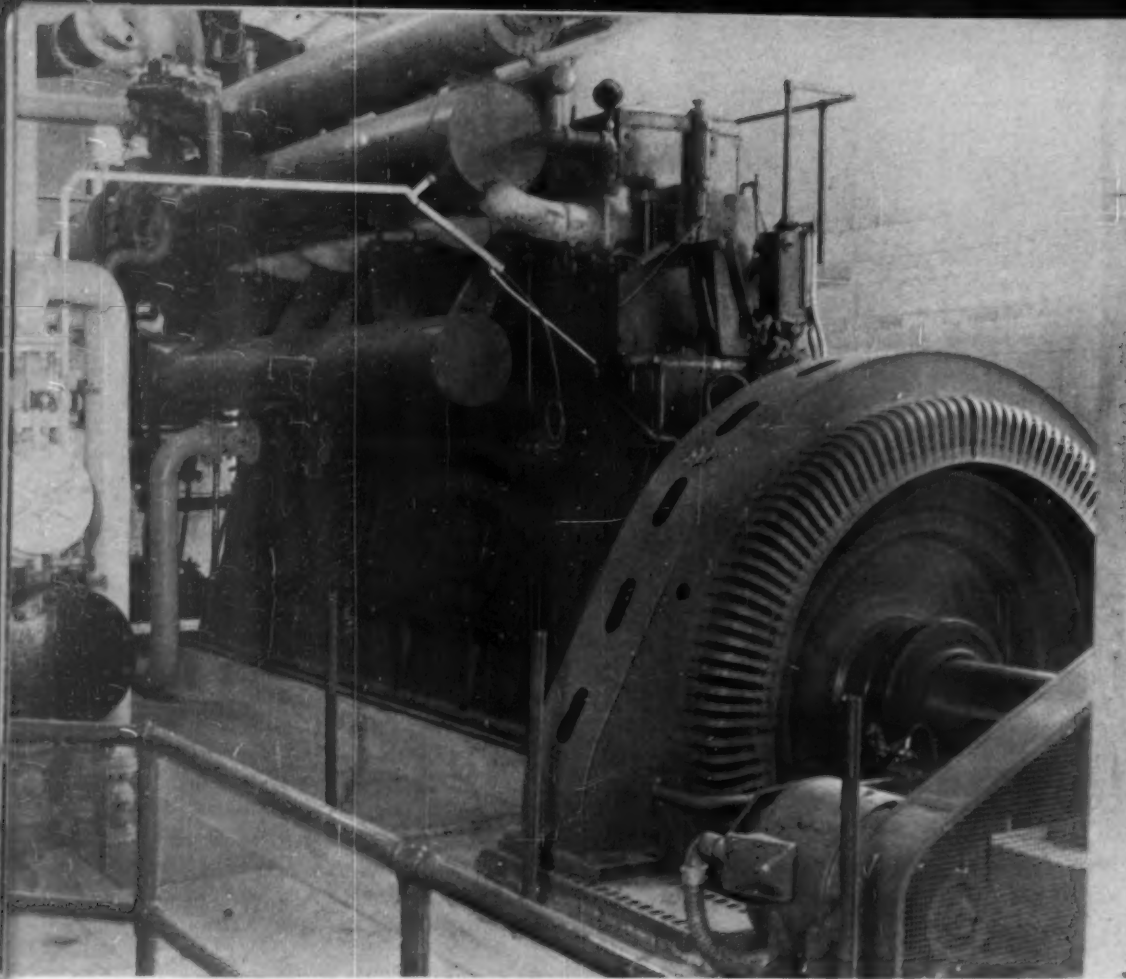
"The purpose of the United Towing Co. is to develop water transport to make available to the public the economies of water transportation," explained Mr. Dyer of the San Francisco Office. "There are three principal ports of call, Eureka and Crescent City, California, and Coos Bay, Oregon. However, the availability of barge service on the Pacific Coast caused Texas Company to erect a storage plant at Moss Landing, California, which can be served only by barge. This plant was opened in 1952. Barge service is used to transport aviation gasoline from Los Angeles to San Francisco and Seattle for the United States Air Force and jet fuel from San Francisco to Los Angeles. We also have a contract to haul benzol from Seattle and Portland to Los Angeles for the Rubber Reserve Corporation. Benzol is a by-product of manufacturing gas from petroleum products."

Taking all of Red Stack's craft, there are 14 tugs, all diesel. The last steam tug was retired last April. The engines powering this fleet of tugs are General Motors and Enterprise. In the United Towing Co. there are 22 barges all with diesel pump engines, and one small tanker, *United*, which operates in Puget Sound waters. It is powered with Atlas twin diesel 350 hp. engines. Seven inland tug boats, ranging from the tug *Dauntless* with twin Cat 110s, to the *Fearless* with 600 Enterprise, are employed in towing the barges of this fleet.

Marine diesel engines are pretty much an old story. Diesels have powered ocean craft almost from the first diesel engines built. At least, they got the call right after they had proved their place in stationary pumping. So, it was not surprising to learn from Port Engineer Jim Rettig of United Towing Co. that maintenance of the GM diesels powering the company's sea-borne and harbor boats is "pretty much routine."

Said Rettig: "Our change-over to modern equipment—diesels—began in 1939 and '40 with the construction of barges 8 and 10. These two were Dravo-designed. We don't have much trouble. The sea-borne craft are maintained at the end of their run with practically no lag in close schedules that keep them working all the time. Maintenance is on a trip basis. We have out maintenance mechanics who meet the barges and follow through to completely check the barge. Engines and pumps are first checked. The maintenance force is two men with trucks outfitted to catch the barges on the run. That is, they meet them at the San Francisco end of a round trip and check them out for engines and pumps, noting any need of major repairs. They spend most of their time on board while the craft is loading or unloading. Even engine overhauls are made while the boat is working, maybe two or three trips being made to complete a job while schedules are maintained by the barges. There are three pumps and three engines on each sea going barge. Engines are GM and pumps are Kenney and Watrous.

The change-over from old engines to modern diesels came with new boats and all old ones were dropped from service. The United Towing Co. hauls lots of oil around the bay here from the refineries to the depots. These craft are maintained the same way as are the sea-borne craft.



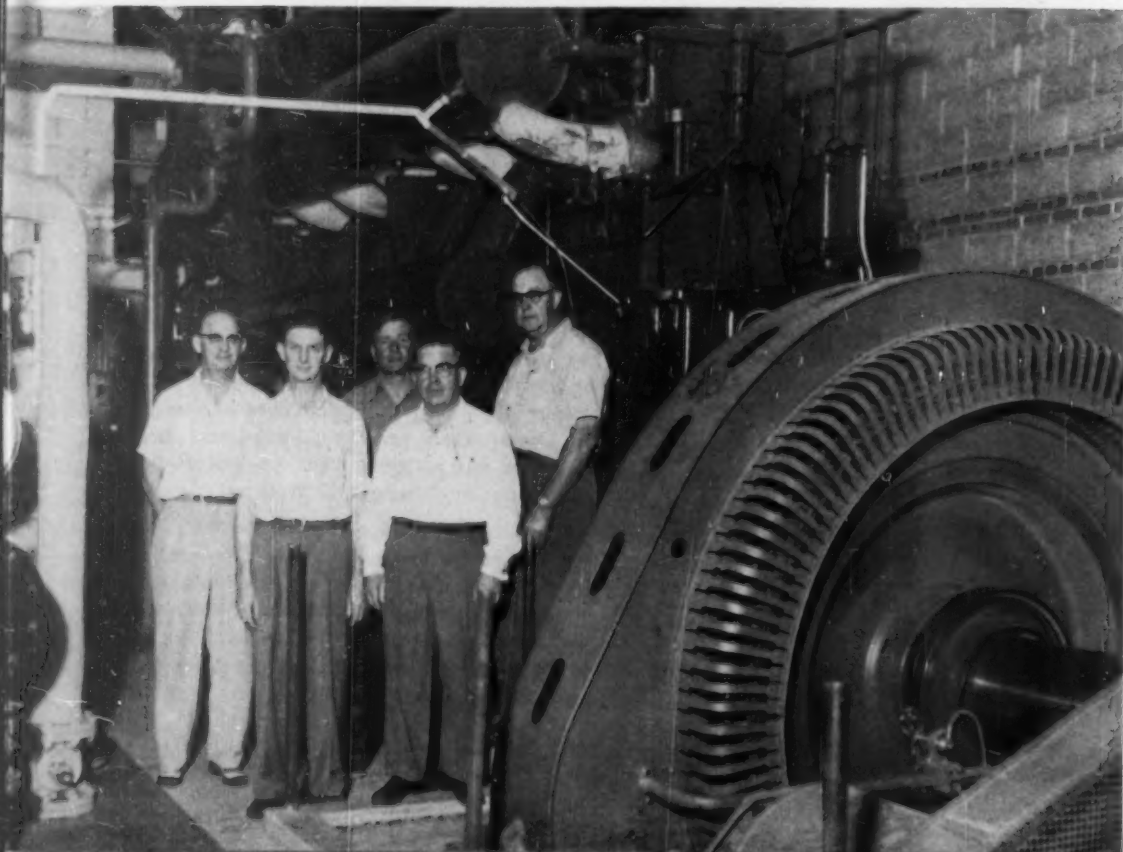
The 1000 kw., 1425 hp. at 360 rpm. Worthington engine at Kingman, Kansas. Generator and exciter are Electric Machinery. Hilco lube oil purifier is at left. The diesel is Elliott turbocharged and has an Air Maze air intake filter.

KINGMAN, KANSAS

By THOMAS C. KIRKWOOD*

*Member of the firm of A. C. Kirkwood & Associates, Kansas City, Missouri, consulting engineers on this installation.

Kingman city officials pose in front of the new Worthington. Left to right: Marvin Wallace, commissioner of finance; Eldon Steinhaus, city clerk; George Frisbie, superintendent; W. E. Layman, mayor; and M. V. Covington, commissioner of public utilities.



TO meet the steadily increasing demand for electric energy which the citizens of Kingman, Kansas, have placed on their municipally owned generating plant, the City Commissioners embarked upon an improvement program early in 1952. About one year after consulting engineers were employed for the preparation of a report and estimate, the new generating unit was placed in service. Although the engine-generator unit and other equipment were previously on the site, energization was later than had been planned because of delayed delivery of several smaller pieces of equipment as a result of strike conditions in the east at sources of supply.

The city has enjoyed a long history of municipal power plant operation, and the city officials associated with the utility through the years have been well known and respected over the state. In addition to the electric utility, Kingman operates its own water system at the power plant location; two underground reservoirs provide the storage capacity. These are supplied by a spring three miles away, although this source is supplemented by several wells on the plant site.

The City Commission at the start of the project consisted of Dr. George E. Burket, Mayor; Marvin Wallace, Commissioner of Finance; and Millard Hobson, Commissioner of Public Utilities. With the retirement of Dr. Burket and Mr. Hobson, during the course of the improvement program, the Commission is now composed of W. E. Layman, Mayor; M. V. Covington, Commissioner of Public Utilities; and Mr. Wallace, Commissioner of Finance. The water and light plant superintendent is George Frisbie. The present City Clerk is Eldon Steinhaus, who succeeded C. J. Peterson during the course of the program.

The power plant has enjoyed a steady growth of generation over the years. In the twenty years from 1932 through 1951, the annual generation in kwh. increased almost $3\frac{1}{2}$ times, and in all except one year during this period the annual total was greater than that for the preceding year. Likewise, the annual peak demand has also grown, almost tripling in the same twenty year period. A noticeable improvement in the annual load factor indicates a more desirable usage of the plant's generating equipment. By late 1951, it was apparent that the increased loads since the last engine addition in 1947 required the installation of a newer and larger unit. Prior to this expansion program, the plant contained four generating units. The oldest, installed in 1929, is a 450 hp. Busch-Sulzer air injection engine, driving a 300 kw. General Electric generator. In 1935, a 375 hp. Worthington engine was installed, with a 250 kw. General Electric generator. This unit has just recently been converted for dual fuel operation, with resulting savings that should complete payment of the conversion cost within a short while. Improvements were again made in 1940, with the addition of a Busch-Sulzer 600 hp. engine and a 400 kw. Electric Machinery generator. The newest and largest unit up to the present addition, is a 720 hp. Busch-Sulzer engine turning a 500 kw. Electric Machinery generator. Installed in 1947 as an oil engine, this unit was converted to dual fuel operation two years later. The

plant generation and city distribution are at 2400 volts, 60 cycles, three phase.

An interesting feature is the cooling system employed for the existing units. Excess spring water flow above the water system requirements is passed on to the cooling basins. This water is wasted to the river after flowing over the cooling coils located in the basins. The engine jacket water is circulated through these coils and back to the engines. However, the growing demand for city water plus the enlarged cooling water requirements occasioned by increased power plant loads has reached such a level that a cooling tower system is employed for the new engine.

The improvement program was initiated in February, 1952, when the consulting engineers were retained. The first step was the preparation of a report to determine the necessary additions and to estimate their cost. The studies showed that a new dual fuel unit of about 1000 kw. capacity would be the best selection based on present and future firm capacity, operating loads, investment costs, estimated date of purchase of the next unit, and other factors. Short circuit current investigations pointed out the fact that some of the existing circuit breakers would no have sufficient capacity to positively interrupt possible fault currents, so these breakers were necessarily recommended for replacement. Cooling system, switchgear, and other facilities were also covered in the report, of course. The report and estimates were presented and approved late in February, and four weeks later the specifications for the engine-generator unit and certain auxiliaries were issued.

The purchase of the generating equipment from the Worthington Corporation was made in April, 1952. The four cycle, supercharged, dual-fuel engine is rated at 1425 hp., 360 rpm. and drives a 1000 kw., 1250 kva., 2400/4160 volt generator. The exciter is a 15 kw., 1750 rpm., 125 volt dc. machine, V-belt driven. The entire unit is capable of carrying a ten percent overload continuously for two hours under standard conditions.

Following purchase of the new engine-generator unit, the final design was completed on the project and the remaining equipment was purchased. The new cooling tower is a double flow aquatower rated at 436 gpm. at a 20° approach and a 20° rise, with a two-speed 7½ hp. fan. The jacket water cooler is rated at 3,400,000 Btu. per hour. New pumps for the plant include two 20 hp. vertical turbine type centrifugal raw water pumps and two 15 hp. close-coupled centrifugal jacket water pumps. The raw water pumps are located outdoors over a sump adjacent to the cooling tower. Included in this contract was the use of temporary switchgear to allow operation of the new generating unit before the delivery of the new metal-clad gear, which at that time was a particularly long-delivery item. The generator and switchgear are designed for possible future reconnection to 4160 volt operation.

The structural work was performed by Boroughs Concrete Foundations, of Kingman. This contract consisted of the engine foundation, building addition and alterations, the cooling tower basin, and

miscellaneous equipment. Engine foundation work was complicated by the necessity of running a ten-inch cast iron water main through the foundation. An 18 inch steel sleeve was poured in the foundation, and a length of mechanical joint pipe was placed in this sleeve. Piping and cooling tower erection were done by Piping and Engineering, of Wichita. Included in addition to the general plant piping were a Worthington air compressor and receiver with automatic pressure control for a range of 200-250 psig. Power wiring was awarded to the Atkinson Armature Works. Piping and electrical work were designed to allow future installation of additional facilities with a minimum of trouble and no more expense than necessary.

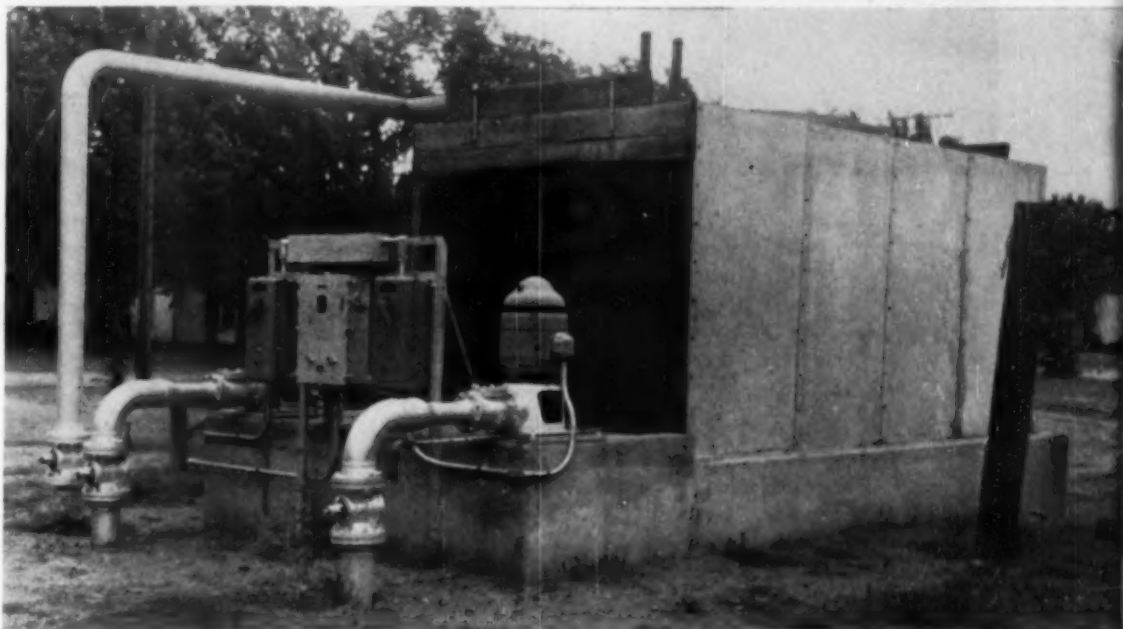
Gas is supplied to the Worthington engine through a positive displacement meter, allowing Superintendent Frisbie to keep a close check on the amount of gas used in operating the unit. Jacket and raw water piping systems are arranged for header operation as future units are added, thereby increasing plant reliability. In order to provide easy

bond issue. The work was carried forward under the authorization of the DEPA and the requirements of the controlled materials program which existed at that time. Final tests of the engine and inspection of the work were held in early July. Tests were not scheduled until the engine had accumulated nearly 1000 hours of service in order to obtain the true operating conditions. The generating unit was actually placed in service in early February of this year.

Under conditions of rapidly changing demand and usage, it is necessary that those municipal officials charged with the responsibility of operating the city utilities act wisely in insuring a reliable source of electric energy for their system. The city officials of Kingman have well earned the thanks of their fellow citizens by so doing in their community.

List of Equipment

Engine—1425 hp., 16 x 20-in. operating at 360 rpm.
Worthington Corp.



The new Marley double-flow Aquatower cooling tower for the 1000 kw. Worthington engine at Kingman. Two Worthington turbine raw water pumps are in foreground.

pipe identification, the piping is painted in various colors according to a standard color code. Safety features on the engine include an automatic shutdown device operated by engine overspeed, low engine or turbocharger oil pressure, or low fuel oil pressure. Low gas fuel pressure causes the engine to shift automatically to full diesel operation. An alarm system for the unit is coordinated with the shutdown devices to sound in the event of low engine or turbocharger oil pressure, high engine oil temperatures, low or high fuel oil day tank level, low jacket or raw water pressure, high jacket water temperature, or low gas pressure. The alarm panel, pressure gages and thermometers are mounted on the engine gage board adjacent to the unit.

The project cost, including overheads and several items not associated directly with this particular unit, totaled about \$210,000. Under the able management of the Commissioners and the Superintendent, funds had been accumulated to permit financing of the project with no necessity for a

Generator—1000 kva. Electric Machinery.
Switchboard and switchgear—General Electric.
Turbocharger—Elliott.
Voltage regulator—Allis-Chalmers.
Governor—Woodward.
Lube oil filter—Hilco.
Lube oil cooler—Sims.
Lube oil pressure alarm—Panalarm.
Fuel oil filter—Bowser.
Heat exchanger—Ross.
Cooling tower—Marley.
Control valves—Fulton-Sylphon.
Intake air filters—Air Maze.
Exhaust silencer—Maxim.
Exhaust pyrometer—Brown.
Gas meter—Emco.

We extend our appreciation to "Midwest Utilities" for permission to quote from their August, 1953 issue, this excellent article by consulting engineer, Thomas C. Kirkwood.—Editor.



A Caterpillar diesel D2 tractor with No. 42 tool bar and front blade attachment is pioneering road down a hillside so cattle will have easier access to barn lot.

CATS AND COWS

WHILE its big brothers, the D7s and D8s, gouge and shove earth and rock to build new roads for automobile and truck traffic, a Cat D2 tractor with a tool bar and front blade attachment is busy pioneering and maintaining rugged hillside highways for Old Bossy in the picturesque Bodega Bay region of California.

Rinaldo Albini has a 541 acre ranch in this coast range area, with 100 acres devoted to hay produc-

tion and the remaining acreage in grazing land for a fine dairy herd of approximately 120 Jersey and Guernsey cows which give an average of 1,500 pounds of milk every day. Albini, however, had a problem which caused him considerable concern.

Due to the steepness of the rough, rocky terrain, many of his valuable animals were meeting with injury in negotiating the rutted trails on the hill-sides and those leading down to the barn lot.

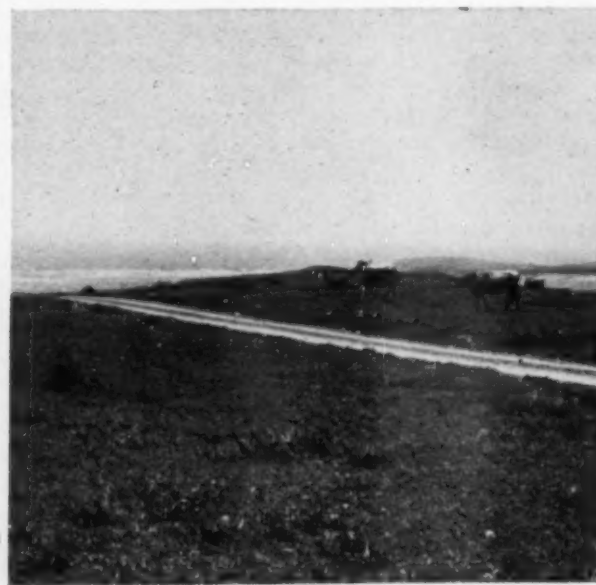
The 'dozer-equipped tractor has been the answer to Albini's problem, for the sure footed D2 shaves out smooth walking surfaces for the herd with ease.

And while the newly made trails are naturally a far cry from national and state traffic arteries, they're safe for the animals. To Bossy they're just as good as those new-fangled freeways their masters find so useful.



Preventing injury to valuable dairy cattle, the diesel tractor pays its own way by making roads down hillsides.

General view of cattle and access road on the Albini Ranch. A total of 541 acres with 100 acres in hay and the balance in grazing land.





Propulsion power for the *Carabobo* is supplied by this National Supply Model 85, Atlas Imperial 6-cylinder, 600 hp., reversible marine engine diesel. During the 1800 mile trip to home port, the engine ran without faltering despite unusually high headwinds and almost constant storms.

DIESEL FERRY "CARABOBO"

NEW ferryboat engines usually have an easy life in their initial stages of operation, but this was not the case with the *Carabobo*, owned and operated by the Compania Anonima de Transportes of Maracaibo, Venezuela. Built in Orange, Texas by the Livingston Shipbuilding Co., the first job of its National Supply Company, Model 85, Atlas Imperial, 6-cylinder, 650-horsepower reversible marine diesel propulsion engine was to take the punishment of an 1800 mile trip from Orange to Maracaibo. And, despite heavy storms and high headwinds for 9 days, the trip was made in 12 days and 23 minutes without the slightest engine difficulty. A log of the trip shows the best day's mileage was 188, and the worst was 86. Average engine

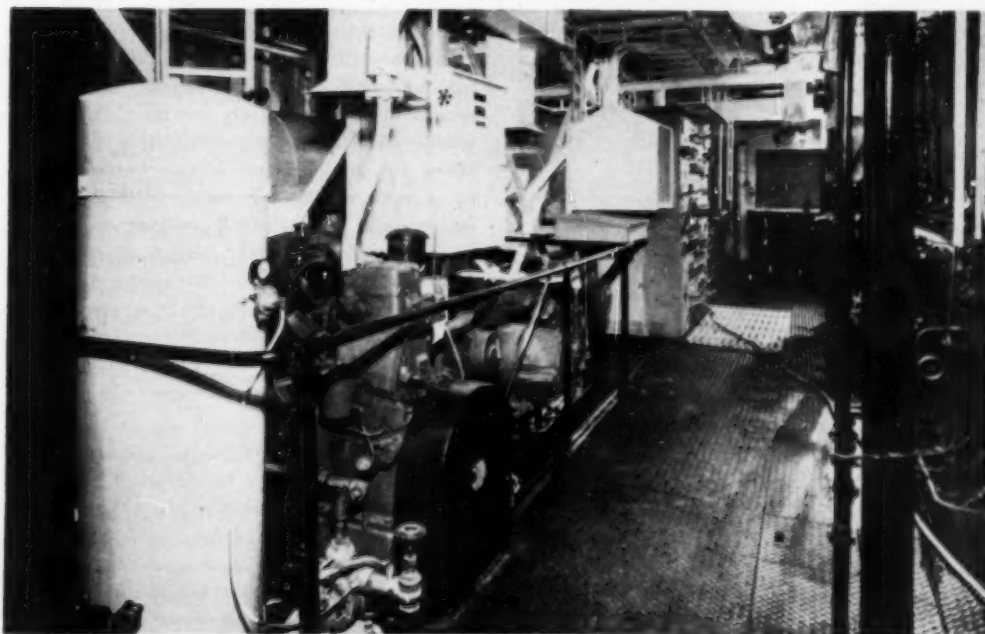
speed was 280 rpm. and exhaust temperature 640 degrees F. for the entire trip.

The *Carabobo* is the newest of the company's six ferryboats operating on Lake Maracaibo between Maracaibo and Palmarejo, gateway to the oil fields in that region. All of them have Atlas diesels for main and auxiliary power. A double-ended craft 162 feet long, designed to carry both automotive vehicles and passengers as well as dead freight, the *Carabobo* is of all-steel-welded construction built to ABS specifications. Main propulsion is through a double-end shaft carrying a 68 in. by 49 in., 4-blade Ferguson propeller at each end of the boat. Gangway ramps at each end of the main deck are

electrically operated to speed up the handling of vehicles. Electrical power for their operation as well as other boat services is furnished by two National Supply Company Model 3HS282 Atlas Imperial auxiliary engines which drive 30-kw., 125-volt direct current General Electric generators. Other power equipment consists of a complete Blackmer pumping system which is cross connected to permit its use for bilge pumping and fire protection simultaneously if needed.

Passenger deck, overhanging the main vehicle deck, is designed to carry 300 passengers and is fully equipped with rest rooms, refreshment facilities and steward's storage. Upper, or third deck carries a pilot house at each end with duplicate navigation equipment, controls, and ship-to-shore radio telephone. Sound-covered telephones provide boat-wide communication. Double-end Markey steering engines operate on compressed air, but, in emergency, pilots can convert to manual steering.

Starting air for the diesels is furnished by this storage tank which is kept up to pressure by a motor driven air compressor. A Witte diesel driven compressor serves as stand-by for emergencies.



List of Equipment

Main engine—Model 85, Atlas Imperial, 6-cyl. 650 hp. direct reversing, National Supply.
 Auxiliary engines—Two 50 hp. Atlas Model 3HS-282, National Supply.
 Pyrometer—Alnor.
 Engine gauges—U. S. Gauge.
 Coupling—Thomas Flexible.
 Thrust bearing—Kingsbury.
 Silencers—Maxim.
 Tachometer—Weston.
 Heat exchangers—Ross.
 Mechanical lubricators—Manzel.
 Coupling on auxiliaries—Falk.
 Generators—General Electric.
 Auxiliary diesel on compressor—Witte.
 Thermometers—U. S. Gauge.

DIESEL EQUIPMENT DRILLS FOR STEAM IN NEW ZEALAND

A Difficult Assignment Is Ahead as American-Made Oil Well Drilling Rig Set Up Will Drill for Steam Rather Than Oil and Will Encounter Pressures up to 200 PSI and Temperatures up to 400° F

GOVERNMENT engineers of New Zealand striving to increase the Commonwealth's present inadequate supply of electric power and also possibly to facilitate the low-cost production of

atomic energy are engaged in an unusual drilling operation. Using oil well drilling equipment they are attempting to tap veins of live steam in underground zones of thermal activity proven to exist on

the North Island. The immediate plan is to bring the steam to the surface in quantities sufficient to operate turbo-generators for the production of electrical current. But the ace in the hole, which may bring new prosperity to the British Commonwealth, is the possibility that the steam may also be useful in the production of "heavy water."

National Supply rig using two GM Detroit diesel torque converters.



Heavy water, used in the operation of atomic reactors, is a commodity which has sold for as high as \$200,000 per ton. If estimates of the quantity that can be produced prove to be accurate, and the venture is successful, New Zealand should have a supply of heavy water sufficient to facilitate the ultimate use of low-cost atomic energy in industry. Pools of boiling mud, geysers and other surface manifestations in New Zealand have long indicated the presence of underground thermal activity. These manifestations once led operators of a hotel to drill to a depth of 300 feet in an attempt to get steam for heating purposes. The project ended in failure, but confirmed the fact that wet steam actually existed at this depth. Other deeper exploratory bores delivered up to 8000 pounds of 94% dry steam per hour. It is now planned to put down bores to a depth of 5000 feet, if necessary, despite the high pressures that may be encountered. To do this the government has selected equipment commonly used for drilling oil wells in the U. S.

A dealer in the city of Wellington provided the heavy duty drilling equipment required. He supplied two Ideal drilling rigs and four mud pumps manufactured by the National Supply Company. General Motors Series 71 diesel engines with torque converters were selected to power the units. This equipment met specifications compiled by the New Zealand engineers in charge and one of the drilling rigs is already set up on location. Although similar rigs manufactured by National and using GM Detroit Diesel engines are currently drilling oil wells to depths of over 10,000 feet in the United States, the New Zealand drilling operation with bores averaging 12 to 14 inches in diameter, will undoubtedly prove to be a gruelling test for the equipment and a somewhat dangerous assignment for personnel. It is expected that temperatures near the boiling point of water will be encountered at 100- to 200-foot depths. Steam pressures of over 200 pounds to the square inch and temperatures of over 400° fahrenheit are anticipated.

However, the steam is there and plans to harness and process it have been carefully laid by experts. If New Zealand engineers bring in a "gusher" that assures an increased supply of electrical current or perhaps even low-cost atomic power, equipment made in America will have helped to bring about a new prosperity for the Commonwealth.

"J. R. Moore"



This all steel twin screw diesel 38 footer, the *J. R. Moore* uses two General Motors diesels series 6:71 rated at 200 hp. each. The reduction is 2:1. Hydraulic gears are used. The *J. R. Moore* is speedy, safe and economical. It has the OK of the Coast Guard to operate as a Crewboat Water Taxi at the mouth of the Mississippi where it was just delivered by Equitable Company, Inc., New Orleans.

Standby Power



Standing by to supply power for critical instrumentation and controls in the event of utility power failure will be four Caterpillar D397 Electric Sets recently shipped to Oak Ridge, Tenn., for installation in one of the Atomic Energy Commission's huge plants. One of the engines is shown here as it left the factory at Peoria, Ill. The 500-horsepower engines which will deliver 300 kilowatts in continuous operation are equipped with automatic air starting devices which will start supplying the emergency power in ten seconds or less after interruption of utility power. The four new engines will supplement previously installed standby facilities at Oak Ridge which include ten Caterpillars.

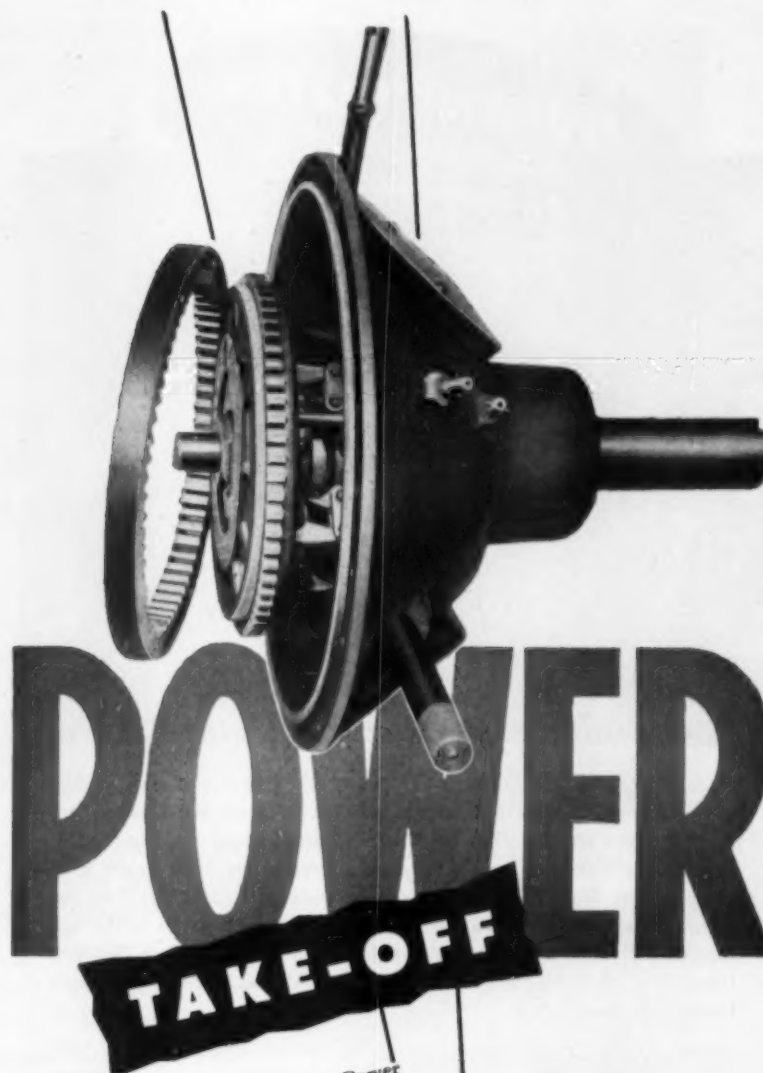
Diesel Throttle Control

A new positive action, friction-type throttle control designed to improve the performance of diesel equipment has been announced by Link-Belt Speeder Corporation. It provides an infinite range of speeds for shovels and construction machinery, industrial and farm tractors, marine engines, crushers and drilling rigs, and similar equipment.

ASME Panel Members

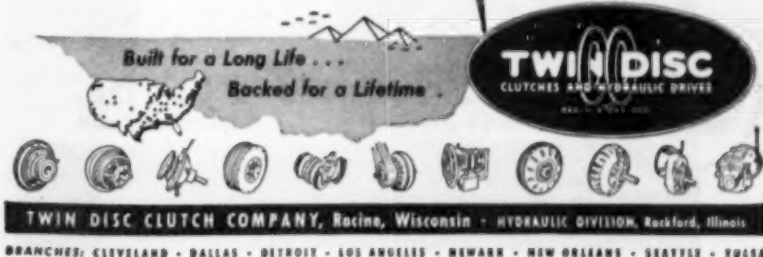
Additional members who will appear on the Diesel Oil Purification panel of the forthcoming meeting of the ASME in New York are R. McBrien, representing the Denver & Rio Grande Western Railway; and T. Thompson, representing the Fairbanks-Morse Company. This important diesel discussion will be held on Tuesday, 9:30 a.m., December 1, 1953 as part of the society's annual meeting.

DECEMBER, 1953



There's more to a Twin Disc Power Take-Off than meets the eye. They last, and last... because—driving and driven plates provide positive clamping action; slipping capacities are in excess of rated capacities; tolerances are more exact, to assure quicker, easier engaging and disengaging. And when they do wear out, they're backed by the fastest, most thorough service program in the field—with 60 Parts Stations, 8 Factory Branches—fully staffed and stocked. If power take-offs enter your industrial power picture, consult Twin Disc first. Call your nearest Twin Disc Factory Branch where stocks are maintained for emergency requirements.

Twin Disc Power Take-Offs are available with clutches ranging from 6.5" to 24" single-plate, from 11.5" to 24" double-plate. Housing sizes No. 6 S.A.E. to No. 00 S.A.E. Capacities up to 650hp. Write for complete specifications, Bulletin No. 129-C.





In romantic, historic Taos, New Mexico, trouble-free power service is vitally important. For that reason the Kit Carson REA plant uses three Nugent Duplex Fuel Oil Filters to protect and prolong the life of its three 960 H.P. Diesel Engines. These heavy-duty diesels generate power for all of Taos County, part of Colfax and Arriba Counties and parts of southern Colorado. A break-down in the system would affect 24,000 people including a group of Taos Citizens who drive to work each day at the Los Alamos Atomic Research Center 60 miles away.



Above: Nugent Duplex Filter—the type used to filter fuel oil for the Kit Carson REA plant, Taos, New Mexico.

Wherever engines must give long dependable service, Nugent filtering provides the type of protection that is essential. Offering more effective filtering at lower cost, Nugent filters are available in a complete range of sizes and types to meet every need. They utilize inexpensive bag-type cartridges having 20 times the filtering area of other filters of comparable size. Write for full data, outlining your filtering requirements.

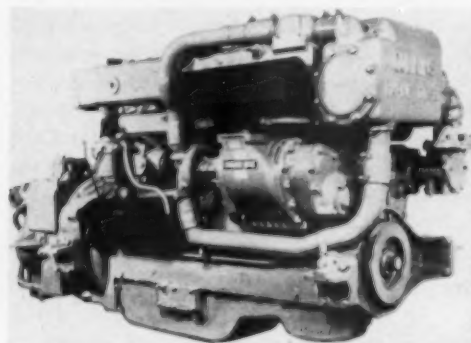


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Lightweight Marine Diesel

Cummins Engine Company, Inc. has announced a new marine engine claimed to be the lightest weight of any marine diesel produced in the 80 to 125 continuous horsepower range. The JMS-600 weighs 21.1 pounds per rated horsepower when completely assembled with reverse and reduction gear and all other accessories necessary for a complete boat application. Compactness is one of the features of the new diesel as it has been built for boats where space is at a premium. It measures



Compactness and clean design of the JMS-600 Cummins diesel are shown here. Accessories are gear driven, leaving the front of the engine free of belts.

66½ in. from the front to the take-off flange of the gear—24-21/32 in. from crankshaft to the highest point on the engine—overall width 27½ in. allows adequate space around engine when installed. JMS-600 is a six cylinder, 4-cycle, 4¼ in. by 5 in., and a piston displacement of 401 cubic in. Compression ratio 15.5 to 1. Cummins engineers rate the JMS-600 at 140 hp. at 2200 rpm. for pleasure boat applications; 123 flywheel hp. at 2200 rpm. for heavy duty applications, workboat, fishing, etc. Complete weight, 2450 lb. including accessories.

New Solvent Spray Gun



Continuous spray cleaning by solvent, emulsion or aqueous solutions is made easier with the new model B-202-M siphon spray gun offered by the John B. Moore Corporation, Nutley, New Jersey.

The gun is designed to draw cleaning fluid directly from a 55 gallon drum and eliminates lost time needed to refill small supply can reservoirs. Many novel features of design suggest its use for washing aircraft, cleaning electric motor parts and stator-frames, engines and engine compartments and other mechanical equipment. A die-cast handle, built to stand over 4 tons of shock, air-flow control valve on the haft to save trips to the air-supply regulator valve, ball-check to prevent fluid flow-back and adjustable lock-tip nozzle are features which appeal to those who work at shop floor level, as well as to those who work on scaffolding to clean aircraft, and hard to reach surfaces.

DIESEL PROGRESS

EARLY 19TH CENTURY SAWMILL IN EAST TOPSHAM, VERMONT



Industrial Giant?



No, Duncan Miller, Vermont logger (pictured left), is no industrial giant, but his power and lubrication needs are just as vital, and served just as assiduously by Cities Service. Cities Service is proud of its long and successful record serving America's top industrial organizations, but it is equally proud of its record with the "Duncan Millers."

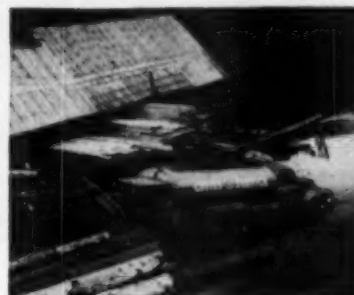
Says Duncan Miller: "I produce some 600,000 board feet of lumber a year. My 100-horse diesel drives all my equipment. I use Cities Service Diesel Fuel because it gives me all the power I need and burns so cleanly to provide easier equipment maintenance.

"In my trucks, tractors, chain saw and sawmill, I use Triple HD Koolmotor Oil. I even use Koolmotor in my high speed bearings that carry heavy loads . . . and Koolmotor has done every job with complete satisfaction for me.

"I also use Cities Service Gasolene in my trucks, tractors and chain saw. I heartily recommend it where a lot of power and economy of operation are needed."

You don't have to be a sawmill operator to realize the value of Cities Service one-source buying for the finest, most economical power and lubrication, and the services of our expert Lubrication Engineers!

100-HORSE DIESEL, powered and lubricated with Cities Service Products, is the power plant for Miller's operation.



FOR SEVEN YEARS, Miller has used only Cities Service Products and "They have given best results at all times."



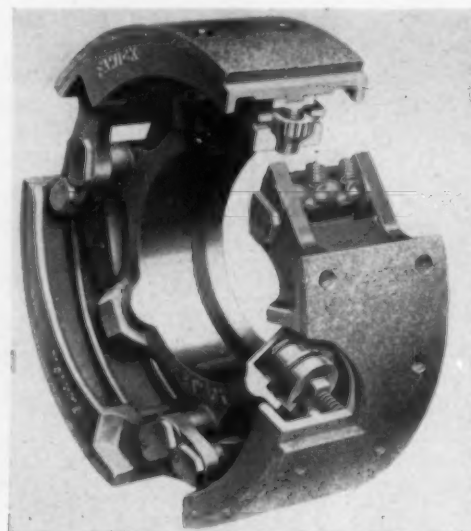
Dual System Vehicle Brake

Under normal circumstances we wouldn't be describing an automotive brake in DIESEL PROGRESS, but this particular brake is so interesting and so applicable to diesel trucks, diesel buses, and off-the-highway pieces of diesel equipment, that we feel that you, our readers, would like to know more about it. So here is a brief description. Full information, of course, can be obtained from Federal-Fawick Corporation, 9919 Clinton Road, Cleveland 11, Ohio, by writing to them direct.

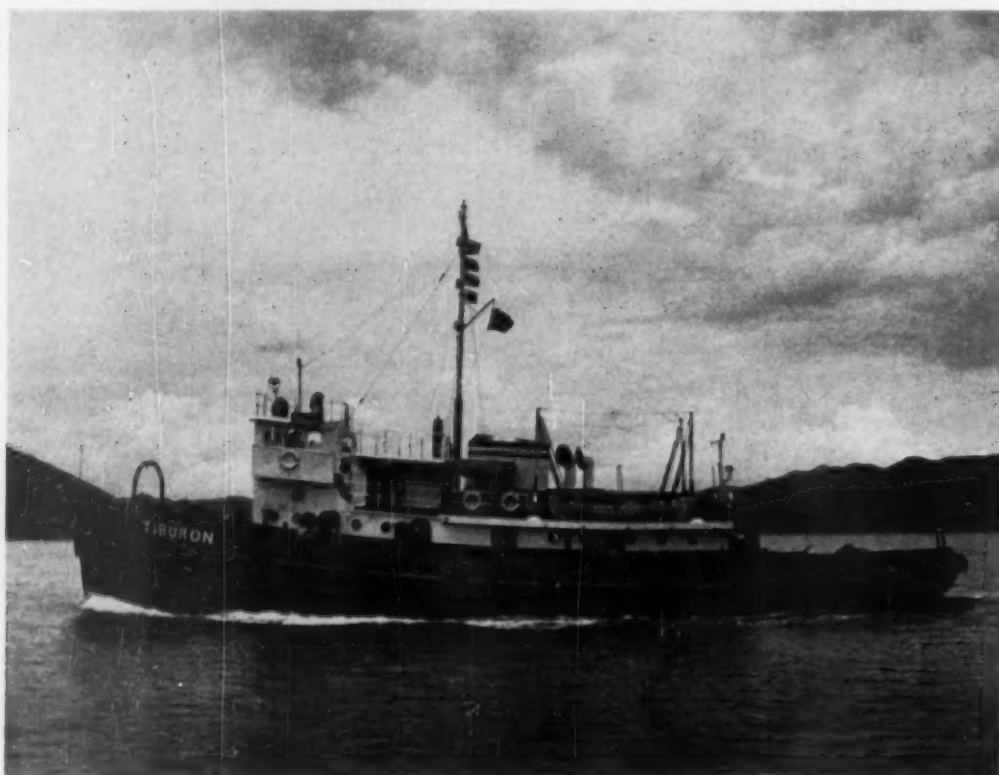
This brake features air operation as a service brake with hydraulic operation for emergency use. The brake thus introduces complete service and emer-

gency braking for all wheels. Both air and hydraulic systems are independent and may be operated either independently or simultaneously. Each system is controlled by either foot pedal or hand lever from a separate source of fluid pressure. Brake and operating mechanism are contained completely within the drum eliminating all air diaphragms or roto chambers, push rods, slack adjusters, and cam shafts used on the present day air or vacuum brake systems. An exclusive feature is a special seal assembly, if required, sealing the brake completely from foreign matter and can be installed without modifying or changing existing axles or drums. Brake sizes run from smallest automotive size using three brake shoe construction and 9 inch drum for hydraulic over hydraulic to a six brake shoe contrac-

tion using a 35 inch drum for a combination air and hydraulic system of operation.



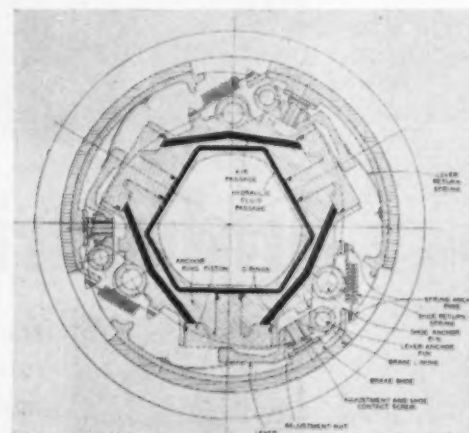
Federal Fawick Corporation Hydro-air Brake cutaway view showing both operating areas of the piston. Fluid pressure actuates each shoe so that it contacts the drum with the same force as every other shoe in the braking system and at the same time. Separation of fluids is maintained with "O" Ring Seals.



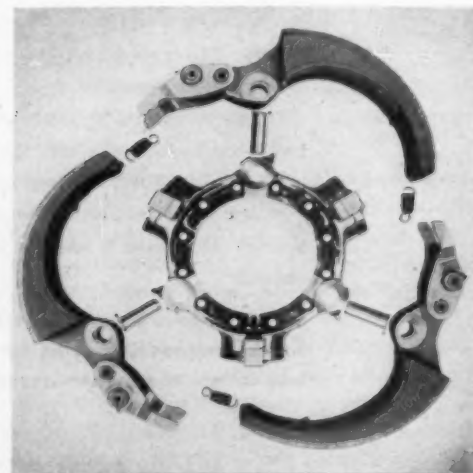
TIBURON

This outstanding ocean going tug regularly plies between ports in the Philippine Islands and those of Japan. Her efforts have contributed greatly to the rebuilding of a friendly, helpful and healthy Orient. She is powered with model Z-8 UNION Diesel which develops 1000 horsepower at 300 r.p.m.

The UNION DIESEL ENGINE Co.
2121 DIESEL STREET • OAKLAND 6, CALIFORNIA



Path of two fluids in Hydro-air brake is shown here. Hydraulic fluid acts on the inner and air on the outer areas of the operating piston. Mechanical linkage transmits the fluid pressure through piston and lever arm to force the shoe against the drum. Springs return shoe and piston to starting position. Adjusting nut permits proper regulation of brake shoe with respect to lining.



There are no left or right hand parts and all parts are interchangeable. Complete disassembly is made by removal of three pins. Pistons are not shown in this exploded view of Hydro-air brake.

DIESEL PROGRESS



Fawick Hydro-air Dual System Brake installed. Brake and operating mechanism are contained completely within the drum.

1954 Diesel Meeting

Diesel accessory suppliers are looking forward to the 1954 Kansas City Convention of the Oil and Gas Power Division of the ASME and many are planning to exhibit at this Annual Diesel Meeting. Reservations are being made in anticipation of the large number of engineers who will be in attendance from big diesel operating plants in the region such as municipalities, public utilities, pipeline pumping stations and, of course, many engineers direct from the engine manufacturers. Joseph Clark, c/o ASME, 29 West 39th Street, New York City, is handling space reservations in the exhibit section of the Muehlbach Hotel for June 14 to 17 when the convention will take place. Prospective exhibitors are urged to contact Mr. Clark without delay for space reservations.

Burgess-Manning Changes Agency

The Burgess-Manning Company, Industrial Division, with headquarters in Libertyville, Illinois, have announced reorganization of sales and advertising policies to coordinate better with the trends towards industrial noise abatement. C. P. Certik, vice president, states: "Having long been cognizant of the prime importance of our silencing equipment in the nationwide noise abatement movement, and further that our particular phase of this great movement has not been properly exploited, we aim to correct this as of now. We are thoroughly convinced that far too few executives of manufacturing concerns realize that 'noise' emanating from compressors, vacuum pumps, blowers and steam discharges is costing them annually in inefficiency of both equipment and personnel, to say nothing of possible compensation claims brought about by this ever increasing evil."

Long rated as one of the leaders in the silencing field, the Burgess-Manning Company provides an extensive line of acoustic devices which, in addition to eliminating noise, incorporate the integral advantages of air cleaning, heat recovery, spark arresting, surge control and others. Also announced was the appointment of Merchandising Advertisers, Inc., of Chicago, as the company's new advertising agency to coordinate and execute the new plans.

New Design Guide

A 24 page catalog packed with engineering information necessary to the proper solution of pipeline expansion problems has just been released by the Flexonics Corporation. This design guide covers expansion joint design considerations, installation instructions, and selection data. The principles of application of various expansion joints is illustrated in a section with schematic layouts. Descriptive data of types of joints available and types of pipeline motion solved by expansion joints is also included. Copies may be obtained from Flexonics Corporation, 1380 South Third Avenue, Maywood, Illinois. Ask for "Flexon Design Guide."

Open Detroit Office

Burns and Roe, Inc., engineers and constructors, New York, announce the formation of Burns and Roe of Michigan, Inc. with offices in the Book Building, Detroit. Announcement is also made of the appointment of Charles S. Lumley as vice president and general manager of the new office. Burns and Roe, Inc. have designed, engineered and constructed many important industrial projects in this country and abroad, including some of the latest jet engine test facilities, and is renowned in the power plant field for its original work in the development of the modern high-pressure, high-temperature, high-efficiency heat cycle.

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**Flexible Coupling
Standard
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Simplicity of
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Complete with engineering data, accessories and information on the use of alternators.

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Council Re-elects Manning

Willis L. Manning, of Libertyville, Illinois, president of Burgess-Manning Company, has been re-elected president of the National Noise Abatement Council for a second term. The Council cooperates with local groups throughout the country in efforts to inform the public on the subject of noise and its reduction in streets, offices, homes and factories.

Elect Damon

Ralph S. Damon, president of Trans World Airlines, was elected a director of Frontier Industries, Inc., at a recent meeting of the board. Damon, who was one of the corporation's charter stockholders,

is the first of the directorate to be recruited outside of Western New York business circles and brings to it a widely diversified industrial background.

Denver Parts Depot

A new parts depot for Caterpillar Tractor Co. will be located in Denver, Colorado, according to Don Gilbert, parts depot manager. The new depot is expected to be in operation about Feb. 1, 1954. It will improve parts service for approximately 14 Caterpillar dealers in Colorado, New Mexico, Wyoming, Utah, Texas, and Montana. Twenty-five people will be employed at the new depot. A manager is to be named later. The depot will carry a full inventory of Caterpillar parts in a 40,000 square

foot building now under construction on East 39th Street. Caterpillar has arranged for a long-term lease of the depot. This will make the ninth parts depot Caterpillar operates. The others are in Spokane, Wash.; San Leandro, Calif.; Kansas City, Mo.; St. Paul, Minn.; Shreveport, La.; Indianapolis, Ind.; Albany, N. Y.; and Atlanta, Ga.

Expand Business in Oregon



C. L. Thompson

Buda expects to take advantage of the forecasted growth of logging, agriculture, general contracting, trucking and general industry in Oregon and fringe counties of adjoining states, according to an announcement made by Alvin Anderson, vice president in charge of West Coast operations of Buda Engine and Equipment Company. In line with this announcement is the appointment of C. L. Thompson as manager of the Oregon branch. Thompson was formerly assistant manager of the California branch. Plans and preparations have already been started for expansion of Buda diesel natural gas and gasoline engines, material handling equipment, and railway supplies sales. The new manager of the Oregon branch is well qualified to undertake this new post. Thompson has been a business consultant and advisor to Oregon firms in the past and has also been closely identified with the construction industry, aluminum extrusion and tubing and the early development of the now thriving aluminum business.

Named District Engineer



Peyton L. Morgan, Jr.

Peyton L. Morgan, Jr., has been appointed southern district engineer for the Air Appliance Division of the U. S. Hoffman Machinery Corporation, New York City. He will coordinate the activities and be responsible for application engineering in Virginia, West Virginia, Ohio, Kentucky, Tennessee, Georgia, N. Carolina, S. Carolina, Alabama and Florida. Morgan is a graduate of Virginia Polytechnic Institute and is a registered engineer. He joined the Hoffman Company in 1948 as an associate of the Lynchburg, Va., representative and has held that position until now.

Named Assistant Chief Engineer

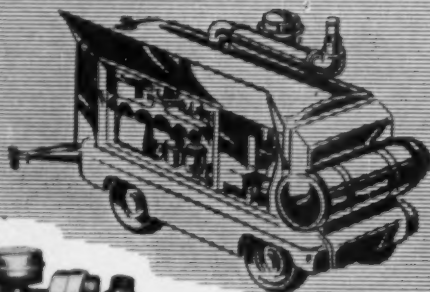
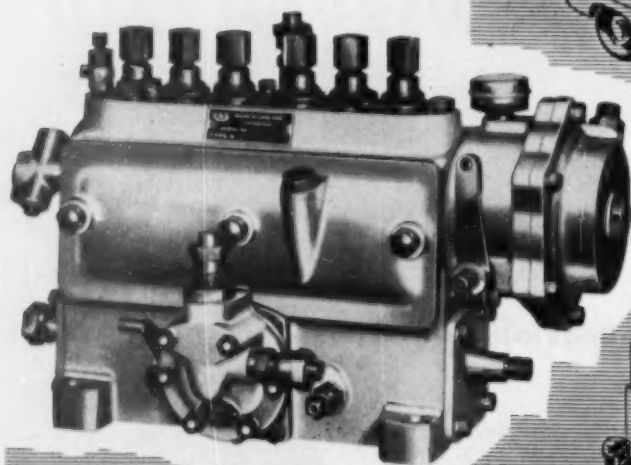


John H. Adams

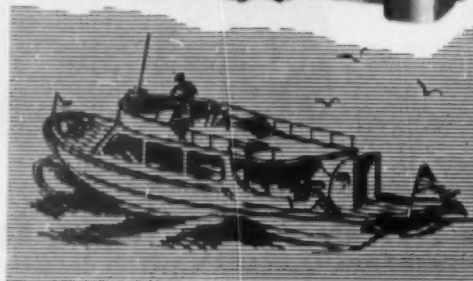
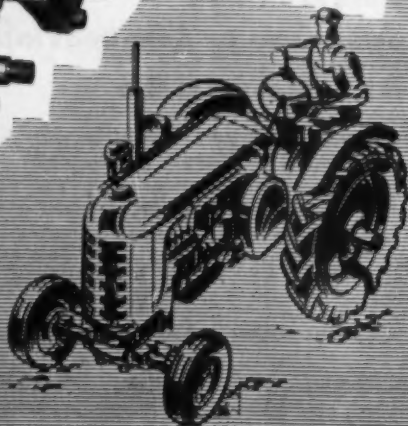
Dollinger Corporation, Rochester, New York, announces the appointment of a new assistant chief engineer, John H. Adams, formerly of Canisteo, New York. Adams is a member of the Rochester Engineering Society and recently was with Distillation Products Industries, Rochester. Adams is also a member of Beta Kappa fraternity and the Toastmaster's Club. He received his B.S. degree in engineering from Lehigh University.



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Fuel Injection and Electrical Equipment

Gulf Coast Diesel News

By Michael T. Pate

SPENCER Construction Company, Fort Worth, Texas, had Buda Engine & Equipment Company install a Buda diesel, Model DAS-844, supercharged, installed in a Super-C Tournapul. The engine is rated at 285 hp., automotive rating.

ANTHONY Boudoin, Galveston, Texas, is having Four Brothers Boat Works, Galveston, install a General Motors diesel marine propulsion unit with 3.75:1 reduction gear to drive a 48x38 5-blade wheel in his new 65-foot shrimp trawler. The Model 62200 is rated at 230 hp., continuous output.

THE City of Houston, Texas, Water Division, has purchased from Fairbanks, Morse & Company, of Houston, a Model 31, 400 hp. F-M diesel, to drive a 300 kw. generating unit at the Water Division's station at Lake Houston dam.

BROWN & Root, Inc., Houston, Texas, has bought through Big 3 Welding Equipment Company of Houston three 300 kw. ac. welding generator sets, each powered by a General Motors Series 2056 diesel, each developing 47 hp. under continuous load.

PLATZER Boat Works, Houston, Texas, has bought a matched pair of General Motors diesels, series 6071 and 6072, and will install the diesel marine propulsion units in a twin screw crew boat which the Boat Works is building for offshore drilling use. The engines were furnished by Stewart & Stevenson Services, Inc. of Houston.

STERLING Drilling Company, Houston, has bought from Buda Engine & Equipment Company, Houston, two Onan 3 kw. marine diesel plants, model 3MDSP, for furnishing auxiliary power.

THE Texas State Highway Department, Austin, Texas, has bought for its McAllen district a Waukesha diesel, model 135-DKU for installation in a motor crane—rated at 50 hp., at 1800 rpm.

CHEMICAL Sand & Service Company, Ardmore, Oklahoma, has bought through Stewart & Stevenson Services, Inc., of Houston, two General Motors model 12103 twin-six diesel power units to power each one Oilwell model 48-PHD high-pressure pump unitized on the customer's trucks.

J. W. MOORMAN & Sons, Oklahoma, has bought through the Dallas, Texas, office of Buda Engine & Equipment Company a Buda supercharged diesel, model DAS-844, rated at 285 hp., to power a Euclid unit in use on their Bolton Dam job.

HOUSTON Contracting Company, Houston, Texas, has bought through the Big 3 Welding Equipment Company, of Houston, six 300 kw., ac. welding generator sets, each powered by a General Motors series 2056 47 hp. diesel engine. The sets are to be used in pipeline laying.

SEABROOK Shipyard, Seabrook, Texas, has bought through Buda Engine & Equipment Company, of Houston, a Buda diesel, model 6-DAMR-273, special, weighing less than 1000 pounds, which

will be installed in a single screw crew boat for use in coastwise drilling operations.

RENO Oil Company, Wichita Falls, Texas, has bought through Stewart & Stevenson Services, Inc., of Houston, two General Motors Model 24103 quad-six diesel units, each rated at 520 hp., to power the main drive unit of a drilling rig.

BURTON Shipbuilding Corporation, Port Arthur, Texas, has bought from Fairbanks, Morse & Company, Houston, two model 31, 150 hp. marine diesels which are to be installed in a car ferry being built for the State of Louisiana. The ferry will be equipped with a screw at each end, both engines driving in either direction.

KERR McGee Oil Industries, Inc., Oklahoma City, has secured from Stewart & Stevenson Services, Inc., of Houston two matched pairs of General Motors Model 62200 230 hp. diesel marine propulsion units each pair to drive, through 2:1 reduction gears (also General Motors) an 83-foot twin screw offshore crew boat for marine drilling service.

To Build New Ferryboat

Washington State Ferries Fleet on Puget Sound is to get a new ferryboat which will cost about \$2 million including architect's fees, equipment and other expenses, according to Floyd McDowell, Washington State Ferries manager. Puget Sound Bridge & Dredging Company was awarded contract for construction on a bid of \$1,658,732.

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There is NO substitute for DIESELPACK'S Patented Filtering Process for H. D. Compounded oils AT ANY PRICE. The DIESELPACK cleans more oil faster—keeps it CLEAN longer—and gives more service and better engineered protection than any other filtering element. It PAYS to get the BEST!

✓ PROTECTS ENGINE

The DIESELPACK is designed to remove not only ABRASIVES but also CONTAMINANTS such as moisture, carbon, acid, etc. from oil, and is engineered to keep the filtering media and the removed contaminants from migrating back into engine. The DIESELPACK assures continuous protection that reduces engine wear and maintenance costs far beyond that possible with other types of filter elements.

✓ EXTENDS PERIODS BETWEEN DRAINS

The DIESELPACK collects and holds even the most finely dispersed contaminants without affecting or removing compound additives from the oil. A glance at the dip stick will show that the oil is CLEANER—symbol of better lubrication and longer oil life enjoyed only by Luber-finer users.

✓ TAKES LESS OIL

The DIESELPACK because of its engineered construction requires 2 to 4 quarts less oil than spongy substitute filter elements being offered for use in the Luber-finer housing. This is an additional saving enjoyed when using the DIESELPACK.

STANDARD of the INDUSTRY SINCE 1936

Since Luber-finer was first introduced to the public in 1936, it has gained worldwide acceptance by millions of satisfied users everywhere. Luber-finers are approved by major oil companies and petroleum engineers. Luber-finers are standard or optional equipment on America's foremost stationary engines, diesel trucks, tractors and earth-moving machinery.

LUBER-FINER PACKS AVAILABLE:

1. **REFINING PACK**—Introduced to the public in 1936 for use with straight mineral oils, fuel oils and inhibited industrial oils.

2. **DIESELPACK**—First made available in 1941, the DIESELPACK was primarily designed for use with H. D. detergent compounded oils under the direction of Dr. Ulric B. Bray, B.S., Ph.D., F.A.I.C., internationally known Petroleum Chemist. The DIESELPACK has also achieved outstanding results when used with fuel oils and straight mineral oils.

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Why take chances with expensive equipment? WRITE TODAY for complete information on what to look for before you buy either Filters or Replacement Packs—see how you can save many dollars and hours in maintenance.

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**COST LESS
TO OPERATE**

In addition to the low initial cost of the 1, 2 and 3-cylinder Nordberg "4FS" series Diesel engines, the outstanding design and construction of these compact units assures extremely low fuel and lube oil consumption... which has been proved in a wide range of power jobs.

**MORE
"EXTRAS"**

Here are the "extras" that are all included in the low initial cost of Nordberg Diesel units: thermostatically controlled cooling system — heavy duty oil bath air cleaner — lube oil cooler — fuel and lube oil filters. Compare before you buy any 10 to 45 hp engine.

**LONGER
LIFE**

Like all Nordberg Diesels, the "4FS" series engines are sturdily built to give years of reliable service with a minimum of maintenance time and expense.

Clip the coupon for details on Nordberg Diesel power units from 10 to 45 hp—Diesel generator units from 6 to 30 kw—or for Diesel pumping units in capacities from 200 to 3000 gpm at 15 to 240 ft. total head.

NORDBERG MFG. CO., Milwaukee, Wis.

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BUILDERS OF AMERICA'S LARGEST
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Send catalog covering Nordberg Type
4FS Diesels. I am interested in a unit
for the following service:

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Company Name
Address
City Zone State
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PHILLIPS Petroleum Company, Morgan City, Louisiana, has purchased through Buda Engine & Equipment Company, Houston, a 25 hp. model 4BD-182 diesel power unit which will be used as utilities engine on a barge the company is operating out of its Louisiana headquarters.

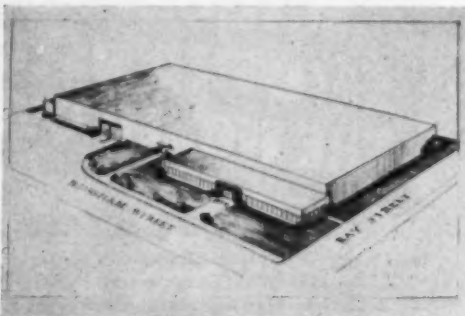
BLUDWORTH Shipyard, Inc., Houston, Texas, has bought through Stewart & Stevenson Services, Inc., of Houston, a matched pair of diesel marine propulsion units, models 6071 and 6072, each developing 166 hp., which will be installed in a twin screw crew boats for service in offshore drilling.

R. H. FULTON & Company, Lubbock, Texas, has bought from Big 3 Welding Equipment Company, Houston, four ac. welding generators for its New Mexico pipeline construction operations. Each unit is powered by a General Motors series 2056 diesel, rated at 47 hp. continuous loading.

OZARK Contractors have bought through the Dallas, Texas, branch of Buda Engine & Equipment Company one Model DA-779 (175 hp.) and one DA-844 (200 hp.) diesels for replacement service in Super C Tournapuls.

HARTWELL Construction Company, Houston, Texas, has bought a General Motors model 6082, torque-converter equipped diesel for powering an Austin Trencher. The engine is rated at 130 hp. continuous load. The sale and installation were made by Stewart & Stevenson Services, Inc.

New Diesel Warehouse



A new one story diesel locomotive parts storage depot will be erected by American Locomotive Company in St. Louis, Missouri, according to an announcement of W. S. Morris, executive vice president. The warehouse will include space for the district sales staff. Floor space will be 30 thousand square feet and provision will be made for addition of storage area and for possible erection of a diesel engine and locomotive component rebuild shop.

McCulloch Plans Supercharger Sales Program

C. F. Breers, vice president in charge of sales for McCulloch Motors Corporation is planning a national marketing campaign in line with the company's production of the McCulloch supercharger described in the November issue of DIESEL PROGRESS, pages 66, 67, 68. Sales and distribution are expected to expand on a national scale as soon as possible. Stromberger, La Vene, McKenzie Advertising has been appointed agency for the account. Don McKenzie is the account executive.

As advertised in TIME, NEWSWEEK
and BUSINESS WEEK

AIR-MAZING FACTS

BY O. SOGLOW



DUST TURNS SUN GREEN! Last July excited westerners swamped the weather bureau with a weird report: the sun was turning green! Dust climbing to a height of over 35,000 feet was believed to have caused the illusion.



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WHETHER YOU BUILD OR USE engines, compressors, air-conditioning and ventilating equipment, or any device using air or liquids — the chances are there is an Air-Maze filter engineered to serve you better. Representatives in all principal cities. For condensed product catalog, write Air-Maze Corporation, Cleveland 28, Ohio.

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Facilitates Cleaning.

Nozzle Cleaning Kit

American Bosch Corporation is distributing a new kit to facilitate the cleaning of diesel engine spray nozzles in a safe and satisfactory manner, particularly diesel equipment in the mining, logging and petroleum industries. The kit is designed especially for pintle types of nozzles and include plastic case, soft wire brush, mutton tallow, nozzle body scraper, seat scraper, two sizes of centering sleeves for re-assembling the unit, and complete instructions.

Sealed Power and Moog Expand

A major move in the replacement parts industry was revealed recently with the announcement that the Sealed Power Corporation, Muskegon, Michigan has sold the front end and chassis parts phase of its business to Moog Industries, Inc., of St. Louis. The transaction, effective immediately, is part of an expansion program on their respective lines by both companies. Sealed Power will continue its piston ring, cylinder sleeve, valve and water pump lines, streamlining their operation by specializing in these engine parts. Moog will concentrate the major part of their expanding production facilities on chassis parts. Terms of the sale provide for Moog to take over Sealed Power's entire inventory of king bolts, shackles, tie rod ends and coil action parts on January 1, 1954. Sealed Power's jobber distributors handling these items can now be served by the Moog organization.

In a joint announcement by H. P. Moog, president of the St. Louis firm, and Paul C. Johnson, Sealed Power president, it was pointed out that the motor and chassis replacement parts are becoming increasingly important and today, lead all others in the automotive jobbers total sales volume. In view of the tremendous sales potential for both engine and chassis replacement parts and the difference in the marketing of each line, it is believed that a separate source of supply for each is in the best interests of the distributor. As "under the chassis" parts specialists, Moog offers a stronger and broader line and will back it with an expanded merchandising staff and vigorous promotion. Likewise, the streamlining of Sealed Power's activities will enable them to concentrate their engineering, service and merchandising efforts on engine parts which have been the back-bone of their operation since 1911.

Schwanhauser Stresses Selling

The Cuno Engineering Corporation held its bi-annual sales conference recently at the Sheldon House, Pine Orchard, Connecticut, and Edwin J. Schwanhauser, executive vice president of the Worthington Corporation, emphasized in his keynote speech that more vigorous, efficient, professional selling must now be done by all industries; and then pointed out that all corporate departments such as production, engineering, and advertising must be closely organized to favorably influence the selling factors of price, product and service. The sales conference which followed and was a five day program was highly successful in promoting an educational exchange of information on

the field of engineered fluid filtration. Topics discussed by management and representatives at seminar type meetings were product developments, new products and markets, application engineering and trade talks. Over forty United States, Canadian and export representatives participated in the lectures and round table discussions.

Great Lakes Diesel Organization

Organized in 1948 by Gene C. Hutchinson to market Detroit diesels, supply parts and service, the Great Lakes Diesel Company, Cleveland, Ohio, originally installed complete service facilities including a dust proof injector rebuilding room and today, under the direction of Frank Jennings, vice

*I didn't begin with askings, I took my job
and I stuck; I took the chances they wouldn't
an' now they're calling it luck.*

*..... and they asked me how I did it,
and I gave 'em the Scripture text,
"you keep your light so shining a little in front o' the next!"*

*They copied all they could follow,
but they couldn't copy my mind.*

*And I left 'em sweating and stealing,
a year and a half behind.*

—Rudyard Kipling, *The Mary Gloster*

DIESEL PROGRESS Rex W. Wadman, Editor and Publisher Los Angeles 46, California

president in charge of sales, has one of the best equipped rebuilding shops in the country. Jennings was formerly with the marine sales department of Detroit Diesel. Treasurer is William Hayden, associated for many years with Hutchinson; Service manager is Edward Enschutz, formerly with Cleveland Diesel; and also with Great Lakes Diesel now and formerly with Cleveland Diesel are Dick Cook, engineer, and Bill Brehm, service representative. The Great Lakes Company has shown a substantial growth year after year and the injector rebuilding department is one of the largest suppliers of genuine rebuilt injectors in the country. General Motors factory engineered replacement parts are used and injectors are packed in original cartons of the Detroit Diesel Engine Division.

Buda Now a Division of Allis-Chalmers Company

The Allis-Chalmers Company officially assumed operation of the Buda Company, 72 year old Harvey, Illinois, firm, on November 1, according to an announcement of W. A. Roberts, Allis-Chalmers president. Roberts said that this addition to his company would be operated as "The Buda Company, a division of Allis-Chalmers." Roberts added that Ralph K. Mangan, with Buda for 36 years and president since 1950, will be in charge of the division with the title of president and general manager. He explained further that Buda, operating as a division of Allis-Chalmers will continue to manufacture, distribute and service all items in its regu-

lar line of products. Roberts said "We intend making, if anything, a more extensive sales effort in all businesses in which Buda previously has engaged." Mangan said that he welcomed the greater opportunities provided by the change. "Our people are proud of the bright history of the Buda Company. We look forward to a period of continued progress and advancement in our new association," he said. Transfer of the assets of the Buda Company to Allis-Chalmers was at the rate of one share of Allis-Chalmers common stock for each 2-1/6 common shares of Buda's.

Buda now produces 23 sizes of diesel engines and 20 sizes of natural gas, butane and gasoline engines, ranging from five to 516 horsepower. These engines are used in all types of application, principally in such industries as trucking, construction, marine, oil fields, logging, and those industries using stationary and portable generator sets. Another major field in which Buda is prominent is the manufacture of earth boring machines, used principally by utility companies, construction contractors, highway departments and the armed services. With this new division, Allis-Chalmers now operates 16 factories, including 12 in the United States, two in Canada and two in England. Other plants are located at West Allis, and La Crosse, Wisconsin; Springfield, Illinois; La Porte, and Terre Haute, Indiana; Norwood, Ohio; Pittsburgh, Pennsylvania; Boston, Massachusetts; Gadsen, Alabama; Cedar Rapids, Iowa; Oxnard, California; St. Thomas, Ontario; Lachine, Quebec; Eling, and Essendine, England completes the list.

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JAEGER "Air Plus" COMPRESSORS are setting new standards of breaking, trenching, ditching, digging, tamping and pressure-testing in pipeline construction. ROCKFORD CLUTCHES help this light, portable compressor do over a hundred labor-saving jobs. Let ROCKFORD clutch engineers help your product engineers utilize the most efficient power transmission controls for your machines.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



ROCKFORD CLUTCH DIVISION BORG-WARNER

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Manzel 1,000-lb. Torque Wrench



To accurately tighten nuts to any predetermined stress during the construction or servicing of equipment in plant, laboratory or field, Manzel-Division of Frontier Industries, Inc., is now offering a torque wrench with a capacity from 0 to 1,000 ft. pounds. This wrench definitely shows when nuts and bolts are tight enough and not too tight. The "Stay Set" dial accurately registers torque reading and remains at maximum after tension is released. Thus a careful check of obtained tension is possible after pulling has ceased. The dial is reset simply by turning the center knob. When the Manzel Torque Wrench is used each bolt will carry its proportionate share of the designated load, assuring uniform tension to prevent equipment failures due to improper or uneven torquing of nuts and bolts. Where heat and pressure are involved, this correct torquing is doubly important due to the increased stress on each part caused by expansion.

Florida Diesel News

By Ed Dennis

JACKSONVILLE Yacht Storage Co. packaged the latest Murphy powered shrimp trawler *Carleen F* for Hollis M. Forrester; the engine room contains a Murphy diesel model M 190 rated at 190 hp. with Snow-Nabstedt 3:1 reduction gears and Twin Disc clutch plus a 900 watt Crofton diesel generator.

SURINAM Navigation Co. of Paramaribo, Surinam, S. A., had their 750 ton West Indies freighter *Prins Bernhard* repowered with a model 45 MX 8 Atlas diesel rated at 600 hp. which provided a 2½ knot increase in speed.

FOR BAHIA, Brazil, the bantam 45-ft. tug *Cimare*, powered with a model 6-110 General Motors diesel rated at 275 hp.; the generating plant consists of two 5 kw. Buda diesel generating sets, the new owners are Cimento Aratu, S. A.

RECENT Enterprise diesel installations were made on the *Wawenock* and *Bonaventure* with models D.M.G.6 rated at 400 hp. and Twin Disc clutches, plus two kw. Lister generating sets.

THE WEST Coast Shipbuilding Co. of Tampa launched their first shrimp trawler, the 73x21 *Helen Ray*, powered with a model D337 Caterpillar. A Hallett diesel and an Onan generator keeps the De Soto batteries up to par.

A MODEL D.J.X.H. Hercules diesel rated at 86 hp. with a Twin Disc torque converter powered the Hough payloader purchased from Florida Georgia Tractor Co., Miami by the W. T. Price Dredging Co. for use on a sewage project.

THE MODEL D311 Caterpillar diesel installed on the Key West shrimper *Florida Keys* by Shelley Tractor and Equipment Co. is being used for refrigeration purposes. Other trawlers that are to have similar installations are the *Nanu* and the *Matacombe*.

A PORTABLE diesel generator set mounted on an International truck to supply emergency power at the Allapattah restaurant using a model G.A. 8 Superior diesel and a 75 kw. General Electric generator. Engineered by Auto Marine Engineers of Miami. A Civil Defense installation.

THE *James E. McGrath* is the latest addition to the Quinn Menhaden Co.'s fleet of 15 Waukesha dieselized vessels to be repowered. The 90 ft. steel vessel had a model 6 L.R.D. rated at 350 hp. installed, additional equipment was a Quincy air compressor, Capital, reverse and reduction gears, and Ingersoll Rand air starting motor; M. D. Moody & Sons at Jacksonville were the engineers on this fine installation.

FOR W. J. Snow, Delray Beach, a model 25 Northwest dragline powered with a Murphy diesel engine model 11 for general contracting work from Florida Georgia Tractor Co., Miami.

THE NEW BRANCH of Diesel Injection Sales and Service of Norfolk, Va., was opened in Raleigh,

N. C. with Alton C. Deans as manager and John Chason as assistant manager. This new branch was needed due to the ever increasing use of diesel engines in the Carolinas.

ON Lake Maracaibo, Venezuela: the McWilliams Dredging Co. took delivery of their new dredge tender *San Carlos*, powered with two General Motors 6-71 diesels and 2:1 reduction gears; her speed is 14 mph.

THE Kennedy Marine Engine Co. of Biloxi, Miss., are opening a new branch at Mobile, Ala. for service and sales on General Motors diesel engines and Onan generators. W. E. Courson will head the new branch operating as far east as West Florida.

HENRY A. POHL INC., distributors of Gray Marine engines for 27 years in the South Florida area, are now featuring the new 37 hp. Continental diesel engine for industrial use along with their present engines, and will handle sales and service for this well known engine manufacturer. Other Florida distributors for Continental diesels are Piston Ring and Supply Co., Tampa; Southern Pipe Supply Co., Orlando.

JACKSONVILLE Yacht Storage Co. recently powered the newly launched shrimp trawler for the Beerbower Shrimping Industries, with a 190 hp. Murphy diesel engine, 3:1 Snow Nabstedt reverse and reduction gears, Twin Disc power take-off, Bowers batteries, Columbian 40x30 propellers.

here's why MIEHLE-DEXTER SUPERCHARGERS put more horsepower in so many LEADING DIESEL ENGINES



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150,000 MILES



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BETWEEN

MAJOR OVERHAULS

Since Using VAPOR BLAST[®] LIQUID HONING[®]*

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Vapor Blast Model 3030

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Inland River Reports

By DAVID I. DAY

ALREADY we are seeing upper Mississippi River towboats working on the Ohio and other streams, getting out ahead of the ice. One of the most noted boats on the upper Mississippi, however, this year never got away from the Ohio. She is the *A. M. Thompson* of the Mississippi Valley Barge Line. She is Calumet-built, four years old and propelled by a neat pair of Enterprise diesels, 2600 hp. total.

JUST AHEAD of the *Thompson*, downbound, was the *Neville* of the Union Barge Line, Pittsburgh, one of the towboats with a great towing record the last 18 years. The last five years she has had General Motors twins, generating some 1500 hp. When seen this trip she had creosote, steel, pipe coating, a 7-barge tow with three or four empty barges.

THE *Neville* is Dravo-built. A day or so after seeing her, we had a good look and took a good picture of the *Beaver*, also Dravo-built. She won fame as the Dravo 42, handling a lot of work with her single Nelsec diesel engine of only 350 hp. rating.

JOINING the major coal boats was the *Powhatan* officially the *Chief Powhatan* of Powhatan Mining Co., Powhatan Point, O. This boat had 11 heavy barges of the so-called "black diamond" and was handling the tow with ease. Many will recall this fine pusher under her old name of *Bullfrog* (Lea River Lines)—built at Sturgeon Bay, using Superior triplets, 960 hp. total.

THE new *Southern* of the Union Barge Line and the new *Jeffboat* of the American Barge Line were attracting many rivermen to see them and take their pictures. Both are doing excellent early work. The former has 3000 hp., twin Superior diesels. The *Jeffboat* is rated at 320 hp.

THE *Polliwog* noted recently passing Vicksburg on the lower Mississippi was seen this time far up the Ohio with a similar 5-barge oil tow, moving against a stiff breeze. This 90-ft. boat has 1800-hp., with twin General Motors diesels, one of the most consistent workers on the waterways.

DESPITE scanty water on the lower Mississippi the river from Memphis south was much in the news the last four weeks. The *W. S. Rhea* of the Mississippi Valley Barge Line fleet was headed south as we write these notes with 15 barges, hunting patiently for deeper water. The engineer chief aboard, Carl Jackson, is one of the best. The boat has twin General Motors diesels, 3000 hp.

OUR COMPLIMENTS to the tug *L. J. Williams* and to her engineers, J. B. Newcomb and Charles Peavy for fine work this fall. Reported last with 80,000 gallons of fuel oil and 40,000 gallons of water for a construction job. She has a 500-hp. Cooper-Bessemer engine.

SEVERAL letters mentioned this big pipeline construction job, serviced by the *L. J. Williams*, which is at Skipwith Bar near Mayersville, Miss. From Mrs. C. D. Isaacs, touring the river coast, we have a nice picture of the *Dan Quinn* near the new pipeline job. The *Quinn* is a veteran on the lower

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DIESEL PROGRESS

river, Nashville-built in 1941 for Patton-Tully Transportation Co., Memphis. The boat now has twin General Motors diesels, 1600 hp.

WE HAVE from J. C. Katterjohn, a neat snapshot of the *Mary Lea Hillman*, recently featured in DIESEL PROGRESS. The boat is evidently out of the Monongahela on the Ohio with six barges of coal and a new empty barge. This pride of the Hillman Barge Line fleet is General Motors powered, one of the best.

AND, "speaking of good investments," said Mr. Katterjohn in his letter, mailed Sewickley, Pa., "consider the *Mokita* doing fine work for Iron City Sand & Gravel people here, 18 years old and rarely sick a day. She used to be in the Street fleet, St. Louis." The boat was built by the Erlbachers at Cape Girardeau, Mo., and has Superior twins, rated at 1000 hp.

ANOTHER famed steamboat has yielded to better and more economical power. The famed *E. D. Kenna* of the Ohio River Company, Cincinnati, was towed south, the superstructure all removed—perhaps to be a landing barge down south. Towing the "remains" was the *Advance* of the American Barge Line, neat Jeff-built boat, using twin Fairbanks-Morse engines, 2880 hp.

Alco Names Four



Ralph M. Darrin, Jr.

Richard K. McCoy

Four new appointments have been made in American Locomotive Company's sales organization including the southeast district where W. G. Lockwood was named district manager; eastern regional sales where Ralph M. Darrin, Jr., and Richard K. McCoy were named assistants to W. A. Callison, vice president in charge of eastern regional sales; and H. M. Short, named assistant to G. P. Link, manager of renewal sales at Schenectady. Lockwood has been with Alco since 1928 when McIntosh and Seymour Company were acquired. He maintains offices at 501 Barr Building, Washington, D.C., and is active in many fields including NDTA, Southern, and Southwestern Railway Clubs, American Ordnance Association, Society of Naval Engineers, and Newcomen Society. McCoy has been with Alco in various sales and service positions since 1946; and Darrin has been with the company as long.

New Allison Office

Petroleum Industry Sales Office, 404 Thompson Building, Tulsa, Oklahoma, has been established by Allison Division of General Motors. Manager of the new office will be John P. Lord, petroleum sales engineer, with Allison since 1941 when he started as a student engineer. F. C. (Red) Randall will be service representative in the area.

DECEMBER, 1953

MR. OPERATING ENGINEER!

-Here's how to get longer life and top performance from every valve, seat and guide installation...

Specify Thompson!

For any big gas or diesel engines you operate... in compressor service, pipeline pumping, refinery, or any other... you can begin to make real savings on engine maintenance—and get better performance—the day you install Thompson replacement Valves, Seats and Guides...

Thompson Engine Valves for all makes and types of heavy duty engines are manufactured under Thompson's own upsetting and hot-forging process. These valves give year in and year out service under extremes of heat, pressure and impact, and every type of engine operation.

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Gentlemen: Please send me, without obligation, full data on Thompson Valves, Seats and Guides for _____ engine service.
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DIESEL ENGINE CATALOG

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- Ingersoll-Rand
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- International Harvester
- Kahlenberg
- Lister-Blackstone
- Mack
- Massey Harris
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- Nordberg
- Oliver
- Packard
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A SIGN POST

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VOLUME 18

The diesel industry is fast growing and competitive. New engines and improvements on older models are constantly being announced by the builders. Your reference must be as up-to-date as the engines on the market. DIESEL ENGINE CATALOG is that kind of reference book. Unless you make use of the latest edition, Volume 18, you are not getting the information you want and need. Products of every major engine manufacturer are described and illustrated in Volume 18. Specifications are included.

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Be sure of your copy. Send in your order now!

"For The Campechee Run"

Two of the most recently launched Florida type shrimp trawlers are the *Hi-Doc* and the *Coral Keys*, Tams designed and built on the banks of the San Sebastian River at St. Augustine, Florida, by Diesel Engine Sales Co. The two are built with superb workmanship and were complete "package units" ready to fish when launched. The *Hi-Doc* is owned by Mike Lanasa of Key West, Florida, powered with a General Motors model 6-110 diesel, turning a 50x44 four blade Columbian propeller. The



The shrimper *Hi-Doc* of Key West on her trial run, powered with General Motors model 110 diesel engine.



The *Coral Keys* of Fort Myers, owned by the Kieser brothers and powered with a Caterpillar D13000 diesel.

Coral Keys, named after Florida's famed coral islands, is owned by Charles and Hilbert Kieser of Fort Myers and powered with a model D13000 Caterpillar Snow-Nabstedt reduction, driving a 48x44 four blade Columbian propeller. Both have Delco-Remy starters and generators Southwest batteries and Goulds pumps. Their average speed on the trial runs were 10 to 11 knots. A long and successful career is predicted for these two Florida built shrimpers as their holds are quickly filled with the pink gold from the warm Gulf waters.



DIESEL PROGRESS

816 No. La Cienega Blvd., Los Angeles 46, California

Enter my order for a copy of the DIESEL ENGINE CATALOG, Volume 18, edited by Rex W. Wadman, for which I enclose \$10.00 (plus sales tax if for delivery in California). Copies may be ordered in the Sterling Areas by remitting £4.0.0 to DIESEL PROGRESS, St. Paul's Corner, Ludgate Hill, London, E.C.4.

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CITY.....ZONE.....STATE.....

Filters Solve Problems

In the November issue on pages 42 to 45 we ran an article which has caused a considerable amount of comment on the dieselization of the sugar industry in Hawaii. Further correspondence coming to us indicates that the lubrication of the diesels used in the planting, cultivating and harvesting of the sugar crop in Hawaii offers some very serious problems. It is interesting to note that all of the diesel mobile equipment used by the Oahu Sugar Company is equipped with Winslow Full-Flow filters which, as indicated by the illustration below, are mounted on the outside of the engine hood to permit the installation of a filter of sufficient capacity for full-flow lubrication and to expedite servicing when refilling becomes necessary.



An Oshkosh cane hauler owned by the Oahu Sugar Company, Ltd. of Hawaii, with Winslow Full-Flow lube oil filter indicated by circle. Engine is 300 hp. Cummins.

More and more full-flow lubrication on mobile diesel equipment is becoming the accepted method of reducing engine wear and keeping maintenance costs within reason.

Cooper-Bessemer Appoints Williamson



R. G. Williamson

Cooper-Bessemer's Los Angeles office will be headed up by R. G. Williamson according to a recent announcement of Stanley E. Johnson, vice-president in charge of sales for Cooper-Bessemer. A graduate in mechanical engineering from the University of Southern California, Wil-

liamson has had extensive factory training in both engineering and operation of diesel engines at Cooper-Bessemer's plants in Ohio and Pennsylvania. Williamson was a captain in the U.S. AAF during World War II and was commanding officer of the 987th engineering squadron based at Okinawa. Williamson replaces Phillip Mettling who recently resigned his position in Los Angeles to become associated with the C. Lee Cook Manufacturing Company in Louisville, Kentucky.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition is now off the press. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California, and be sure of getting your copy.

DECEMBER, 1953

AND AFTER ALMOST A CENTURY...

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dependable
THAN EVER!



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PICKERING
Mechanical and Hydraulic
GOVERNORS



You assure all this when you specify Farris Pickering Governors—dependable performance that has built the Pickering reputation for nearly a century... advanced design that incorporates all the improvements developed by constant research and modern engineering techniques... precision manufacturing on the most up-to-date production equipment... superior service, with immediate availability of replacement parts and rapid processing of orders and shipments. With more than 600,000 now in use throughout the world, the Pickering Governor record speaks for itself.

--and you **SAVE** when your Pickering Governors are "factory serviced"



Your original service cost is your only cost. You get factory "know-how", factory parts, factory adjustments. You get fair-price repairs with parts supplied at net. Your governor is tested and set on a \$25,000 dynamometer—not a junior-sized, "just as good" portable unit that cannot give you load control governing results. You get a Factory Rebuilt Guarantee. Send your governor "home" for service—and save!

Precision Speed Controls Since 1862



Farris

PICKERING GOVERNOR CO.

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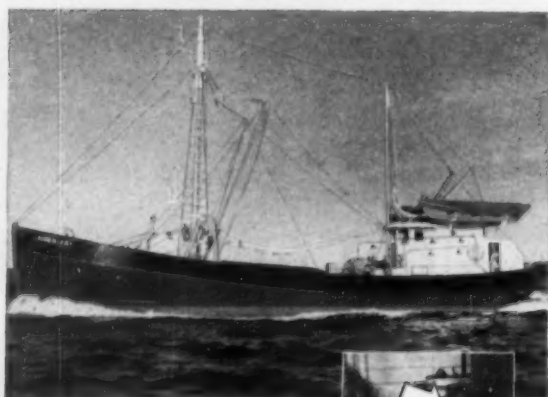
affiliates:

Farris Engineering Corp.
Farris Flexible Valve Corp.
Farris Stacon Corp.
Farris HydroTorque Corp.
Farris HydroSeal Corp.

FRAM FILTERS

give the "Lauren Fay"

- ✓ longer engine life...
- ✓ more savings...
- ✓ greater safety!



When the fishing boat, "Lauren Fay," was built at the beginning of the year, three Fram Filcron Filters were installed to clean the lubricating oil for its Wolverine Marine Diesel engine. The owners insisted on Fram Filters because of previous experience with them. And Fram came through! On duty 24 hours a day while at sea, these Fram Filters have cut operating expenses by reducing engine wear and necessitating fewer oil changes. And by insuring more reliable engine performance, Fram has added greatly to the safety of the crew.

Solve Your Filtering Problems with FRAM!

Whatever your filtering problem—lube or fuel—Fram Filters are the solution. Let Fram's Engineering Department PROVE that Fram Filters remove all engine-killing contaminants one micron (.000039") and larger . . . keeping oil clean even after maximum use. Fram Filters pay for themselves by reducing wear on liners, rings and bearings; increasing time between overhauls, cutting rate of oil consumption. Make your diesels produce at top efficiency for the lowest possible cost . . . write TODAY to the FRAM CORPORATION, Providence 16, R.I. In Canada: Fram Canada Ltd., Stratford, Ontario.



FRAM Filcron
THE MODERN OIL FILTER

FOR MORE SERVICE YEARS

Atlantic Flexible Metal Hose

ITEM

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

- For **VIBRATION DAMPENING**
CORRECTING MISALIGNMENTS
EXPANSION, CONTRACTION
of Diesel Exhausts, Air, Fuel Lines
- For **VENTILATING HOLDS**
- For **LOADING & UNLOADING**
Oils, Molten Chemicals, Refrigerants,
Light or semi-solids

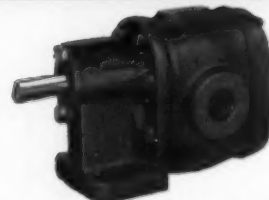
SEAMLESS OR INTERLOCKING CONSTRUCTION
BRONZE, STEEL, STAINLESS STEEL— $\frac{1}{4}$ "-36" I.D.
with fittings as needed.

Write for Bulletin 1020.
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for Product Designers and
Mechanical Industries.

ATLANTIC METAL HOSE CO., INC.
102 West 64th St., New York 23, N. Y.

LONG-LIVED Nos. 53 and 55

Rotary Geared Pumps



with Helical Gears and Antifriction Bearings

Long life is an important characteristic of these Brown & Sharpe Rotary Geared Pumps. Extremely accurate helical gears and precision antifriction bearings assure smooth, efficient operation at high speeds and under pressures up to 200 psi. Specially designed mechanical seal prevents leakage and eliminates gland adjustments.

Two sizes available—No. 53 with 4 to 23.3 gpm. capacity, and No. 55 with 9 to 34.1 gpm. capacity—at 0 lbs. pressure. Write for Pump Catalog listing complete line for diesel applications. Brown & Sharpe Mfg. Co., Providence 1, R.I., U. S. A.

BUY THROUGH YOUR LOCAL DISTRIBUTOR

Brown & Sharpe

FERRO-ALUMINUM BOND EXAMPLES

By H. W. CRUSEY*

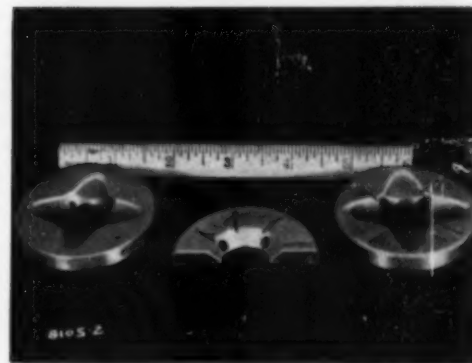
AL-FIN bonded bi-metallic pistons of cast aluminum with molecularly bonded-in ferrous top ring carriers are in use as original equipment on a number of diesel engines including Buda, Caterpillar, Continental, Cummins, Detroit, Mack, and Superior. The secret of superiority is the ferro-aluminum bond which inseparably joins the ferrous ring carrier to the aluminum piston casting. Thus the insert remains permanently fixed in the piston casting throughout its life. Without the bond the aluminum has a tendency to deform around the insert at operating temperatures, such deformation in combination with the pounding of the piston ring causing the insert to gradually work loose permitting blow-by and early piston failure. Al-Fin construction consists of bonding a 3/32 inch layer of aluminum alloy to the skirt portion of the piston. The aluminum clad skirt offers many advantages including lower coefficient of friction, greater imbedability which permits particles of foreign matter, such as in extreme cases broken pieces of piston rings to imbed in the skirt and gradually work their way down. Additionally, since the aluminum clad skirt will not become incandescent if the lubricating oil film fails, there is a lessened chance of danger of crankcase explosion. This construction also makes possible the economical salvaging of worn out damaged cast iron piston skirts.

*Applications engineer, Al-Fin Division, Fairchild Engine and Aviation Corporation.

In the diesel bearing field both plain and flanged bearings of 6% tin-aluminum Al-Fin bonded to steel backs have proven to be quite successful. Through the use of this bearing alloy an excellent combination of bearing qualities is obtained. The main advantage of bonded bi-metallic construction lies in the fact that with the steel backing to support the "crush" and structural loading, it is possible to carry loads as high as 5,000 psi., and yet fully utilize the excellent characteristics of 6% tin-aluminum without the addition of strengthening alloying elements, such as is the case with some solid aluminum bearings carrying a heavy load.

Additionally, by the use of lead indium or lead-tin overlay, the load carrying and anti-seizure characteristics of Al-Fin bearings will almost equal those of silver. In the field of light-weight diesel engines, the use of aluminum gear boxes, transmission cases, and other light-weight cast aluminum housings is made feasible by the bonding-in of ferrous bearing cages and other ferrous inserts at points where great strength or wear resistance are required. And besides automotive diesel applications development work is in progress for advanced type air-cooled and liquid cooled diesel engines for stationary, marine and military applications.

Illustration I shows disc type thrust bearings and aluminum lined cast iron and steel wrist pin bear-



I—Al-Fin disc type thrust bearings.

ing caps are shown II. These products are made by the Al-Fin process in addition to the conventional plain and flanged type sleeve bearings. Another application for diesel engines which has been in production since early 1953 in Great Britain is the bonded bi-metallic Roots type blower rotor for superchargers. Two and three lobe rotors of straight and helical construction are in use. The cored aluminum lobes are cast and bonded directly to the rotor shaft eliminating costly machining and permitting extended life due to reduced inertia and vibratory loading on gears and bearings. See illustration IV for bonded rotor.

Illustration III shows a representative group of Al-Fin bonded aluminum lined steel backed connecting rod bearings operated in a Cummins diesel engine for over 6,000 hours.

LAMB TRANSPORTATION CO.
DIVISION OF TRANSPORTATION INDUSTRIES, INC. • 1001 17TH ST. • LONG BEACH, CALIF. 40

TO: MR. CRUSEY
FROM: MR. CRUSEY
DATE: JULY 1, 1953

RE: BALANCING

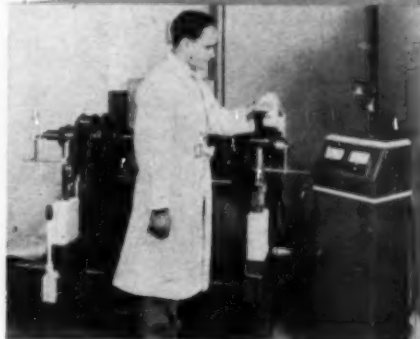
YOUR SERVICE HAS BEEN TO SATISFACTION. THE LAMB TRANSPORTATION CO. HAS BEEN BALANCED BY YOUR COMPANY. THE BALANCING SERVICE HAS BEEN TO SATISFACTION. THE LAMB TRANSPORTATION CO. HAS BEEN BALANCED BY YOUR COMPANY. THE BALANCING SERVICE HAS BEEN TO SATISFACTION. THE LAMB TRANSPORTATION CO. HAS BEEN BALANCED BY YOUR COMPANY.

CAME FROM YOUR SHOP. OUR SHOP SUPERVISOR INFORMS ME THAT BY HAVING OUR CRANKSHAFTS AND CONNECTING RODS ELECTRONICALLY BALANCED IT INCREASES THE LIFE OF THE ENGINE 100% AS FAR AS MILEAGE IS CONCERNED BE-

IN SHIP TO
EXHIBIT REQUIRED.

SIGNED BY:
LAMB TRANSPORTATION COMPANY
Albert F. Crusey
Albert F. Crusey
General Manager

having our crankshafts and connecting rods electronically balanced increases the life of the engine 100%



Electronic Balancing Company in Long Beach has done custom balancing for transport firms for years, using only Stewart-Warner 704 precision electronic job-type balances made by Merrill.

C. M. Mikkelsen, shop superintendent for Crail Transportation Co., writes Electronic Balancing Co.: "We feel that the exceptionally long life of both our Cummins and Hall Scott engines is due in a large part to the balancing. Balancing, in addition to giving a smoother operating engine, will add at least 25% to the life of an engine."

Albert F. Crusey, general manager of Lamb Transportation Co., says to Electronic Balancing Co. in a letter shown above: "... by having our crankshafts and connecting rods electronically balanced it increases the life of the engine 100% as far as mileage is concerned before an additional overhaul." He adds that balancing makes a smoother running engine, saves clutch and cab overhaul, and greatly increases the life of the crankshafts.

Every sizeable garage, fleet shop and speed shop can install a Stewart-Warner 704 balancer and make it pay for itself the first year. Your mechanic can balance each rotating part with a change in set-up of less than two minutes.

WRITE FOR REPRINT of the balancing article in the September issue of DIESEL PROGRESS. We will also send you our latest 704 Balancer Bulletin, no obligation.

☐ Please send me the REPRINT and additional information.

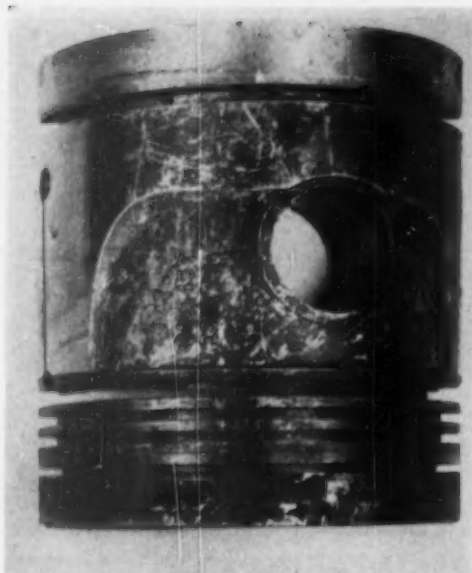
☐ I would like a representative to call.

Name Title

Firm

Address

MERRILL ENGINEERING LABORATORIES
ROOM 405, 1240 LINCOLN STREET, DENVER 3, COLORADO

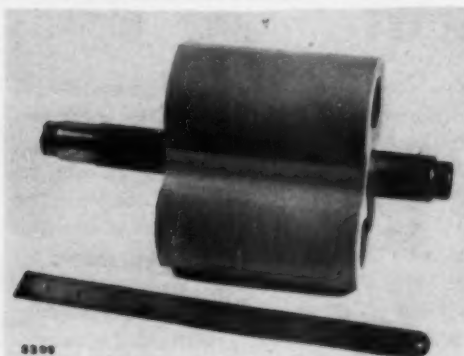


II—Wrist pin and bearing caps made by the Al-Fin process for large diesel engine.

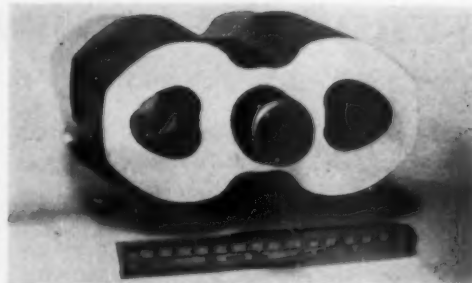


III—Al-Fin bearings after 6,000 hours operation in a Cummins diesel.

IV—Al-Fin bonded bi-metallic Rootes Blower Rotor. Cored cast aluminum lobes are bonded to steel shaft.



VI—Al-Fin armored piston after approximately 350,000 miles of service.



V—Aluminum clad cast iron piston skirt. $\frac{3}{32}$ inch layer of aluminum alloy is Al-Fin bonded to the skirt portion of the piston. The aluminum acts as bearing over full length of skirt.



INTRODUCING

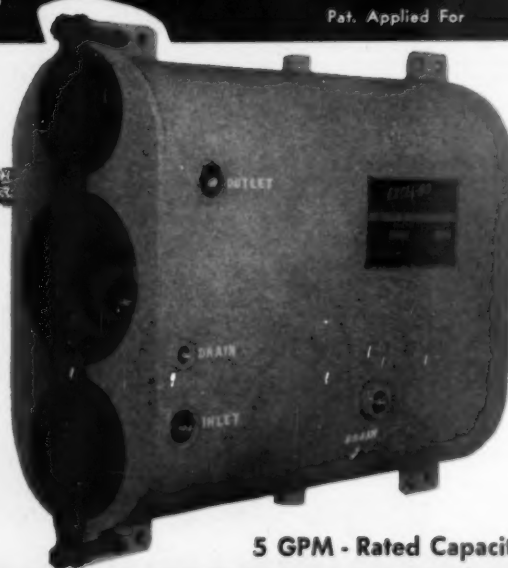
to the railroad industry,
the NEW....

Pat. Applied For

EXCEL-SO FEQ-5

COMBINATION WATER SEPARATOR, MICRONIC FILTER FOR DIESEL FUEL

Stop injector corrosion, erosion, wear and tear, and seizures caused by water and dirt in diesel fuel. . . . This new combination separator-filter is installed directly on the fuel supply to injectors on diesel locomotives, to assure effluent purity of stream to 99.995% and to remove water and solids down to 5 microns at 35 - 45 F. Cuts maintenance costs, down-time and expensive injector overhaul due to contaminated fuel. One injector change costs more than the FEQ-5 and its installation. Takes up a minimum of space (22" x 18" x 8"), cast aluminum construction, universal mounting brackets, standard connections.

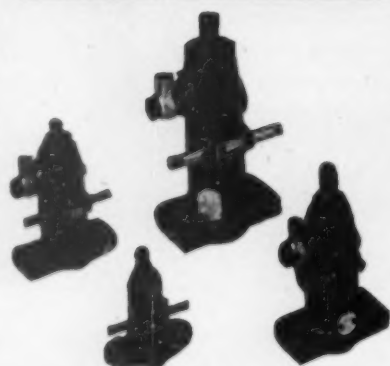


5 GPM - Rated Capacity

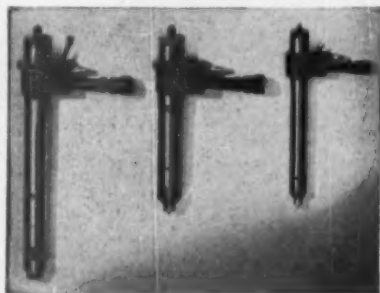
WARNER LEWIS COMPANY

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You Can Depend On ADECO



The ADECO Model "P" Single-Unit Fuel Injection Pumps are of the "port-control" type. Simple and rugged in construction and precision built by ADECO craftsmen, these pumps are extremely reliable.



ADECO injectors are available in four sizes and a number of different styles and lengths. The ADECO water-cooled injectors are made in size No. 4 only, and have built a reputation for excellent performance where heavy fuel oils are burned.

When Ordering Fuel Injection Equipment
SPECIFY ADECO!

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Designers and Manufacturers of Diesel Fuel
Injection Equipment



5435 N. Wolcott Avenue, Chicago 40, Illinois

E-M Names Two



J. E. Hacker

Electro-Motive Division has named J. E. Hacker manager of plant number three at Cleveland, Ohio, and R. L. Terrell has been named works manager at the La Grange, Illinois plant. Hacker was formerly works manager of General Motors Cleveland Diesel Engine Division starting in 1933 until he was transferred to E-M in 1948 as assistant manager. Terrell joined E-M in 1939 as a service engineer. Later, following war service he re-joined E-M as manager in sales, parts, and regional operations before his present position.

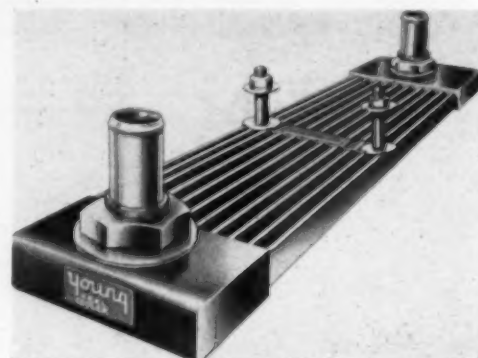
Hand Vibrograph



Mechanical vibrations may be measured now with a hand instrument, compact and light, convenient to carry and operate, the Askania Hand-Vibrograph. Torsional vibrations may be measured and the findings analyzed; in studying mechanical vibrations of all kinds on machinery, shafts, cables, springs, vehicles, ships, airplanes, etc., various accessories are available to increase the usefulness of the instrument.

Marine Engine Jacket Water Cooler

A new line of Young hull coolers designed for cooling 65 to 350 hp. propulsion marine engines has been engineered by the Young Radiator Company to provide a simplified, low-cost method of cooling marine engine jacket water in smaller vessels.



Available in a variety of lengths to meet specific requirements, the coolers eliminate the need for a sea water pump and circuit; hot engine jacket water circulating through the cooler's longitudinal tubes is cooled by water outside the vessel's hull, tubes providing 100% contact with the sea water and thus rejecting engine heat developed by 65 hp. to 350 hp. marine diesels.

Additional coolers may be installed for larger heat loads. Ranging in size from 47 1/4 in. to 88 in. long; 4 3/4 in. to 10 3/4 in. wide; 7-9/16 in. to 10 3/4 in. deep; they are installed easily into recessions in the hull.

Chromium Chemical Technical Publications

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Mutual*

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8 pages
- No. 55—Corrosion Inhibition with Chromate—Oil and Gas Industries
16 pages
- No. 53—Corrosion Inhibitors in Recirculating Water Systems
8 pages
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PALMER ELECTRIC EXPANSION



Don P. Carr

Palmer Electric Manufacturing Company has recently joined the rapidly expanding group of West Coast electrical manufacturing companies owned by G. L. Ohrstrom Associates. Palmer, the originators of the self-regulating alternator, is expanding its engineering, production and sales departments to meet the ever increasing demands for rotating equipment. This active group, which now includes the Leach Relay Company, the Jeffries Transformer Company and the Inet Research Division has just completed the purchase of twenty acres of land in the Downey-North Long Beach area where a new plant will be built.

C. R. Harmon, president, announced the appointment of Don J. Carr as general manager at Palmer. John E. McElligott, formerly with the General Electric Company at Schenectady, New York, has joined the company as chief engineer.

The expanded Palmer line will include 400 cycle, dc., and both regulated and self-regulated alternators capable of operating at 1200, 1800 and 3600 rpm. Light weight alloy frames and bases will enable Palmer to compete favorably from a freight standpoint throughout the national and world markets. D. G. Murray, production manager and George S. Slocumb, heading up sales, complete the Palmer management team.

Production lines at Palmer. Palmer can deliver any standard power unit, diesel or gas and butane, from 5 to 75 kw. including alternator and prime mover within 72 hours after receipt of order and specifications.



Executive Retires

The retirement of Lester G. Mathews, vice president and treasurer of the Sealed Power Corporation and veteran industry leader, was announced recently by Paul C. Johnson, president. Mathews retirement becomes effective December 31st.

He served in various capacities with Sealed Power until 1932 when he was made general sales manager and in 1937, he was elected assistant treasurer and was elevated to the position of treasurer in 1948.



John E. McElligott

A new dealers service program has been initiated and the first of a projected fleet of mobile demonstration units is presently touring the country to work in conjunction with dealers sales program. Palmer production lines have been expanded and the company plans a national and international distributors program with its principal outlets being the engine dealers.

New, complete descriptive literature and competitive price schedules have just been announced.

The company claims the most complete line of diesel, gas and butane powered units featuring all commercial prime movers. Production has been geared to assure shipment of any standard unit within seventy-two hours after receipt of order.

The Palmer self-regulating alternator was the first of its type and was introduced in 1932. The self-regulating feature is achieved by operating the rotating field at the full saturation point and by utilizing constant excitation voltage; due to constant excitation voltage, no adjustment is required.

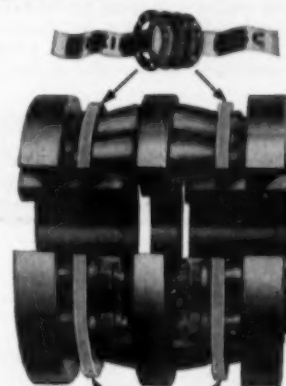
The Palmer alternator is readily adapted to any prime mover having a standard SAE flywheel housing. This is accomplished by means of a standard adapter and the Palmer flexible coupling.

D. E. VASSER, Inc., Natchez, Miss., has commissioned his drilling and work-over barge *L. A. Jett*, built and equipped by the Equitable Equipment Company, Madisonville, La. The drawworks and mud pumps are driven by two sets of dual Cummins NHRMS-600 supercharged diesels with a total horsepower of 1,200. This power set-up also intermittently drives a 12 cu. ft. air compressor.

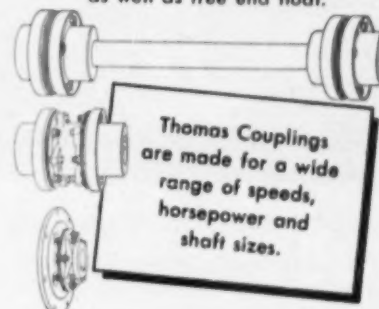
Lighting and auxiliary power are supplied through two 60-cycle generator sets, one of 30 kw. driven by a Caterpillar D-315 diesel, the other of 60 kw. powered by a General Motors Series 671 diesel.

Specify THOMAS ALL METAL FLEXIBLE COUPLINGS for Power Transmission to avoid Costly Shut-Downs

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT

NO MAINTENANCE PROBLEMS

ALL PARTS ARE SOLIDLY BOLTED TOGETHER

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

Powerful Companions for Your Engines



● For over 25 years Columbia has furnished quality built generators for engine drive. They're sturdily built with materials of the highest quality to provide dependable power.

Your needs can be supplied promptly, whether your requirements are for single bearing generators with or without adaptor for SAE flywheel housing, or for units with two bracket bearing design. A.C. ratings 6.25 to 1000 KVA, D.C. ratings 2 to 300 KW. Our engineers will be glad to review your requirements.



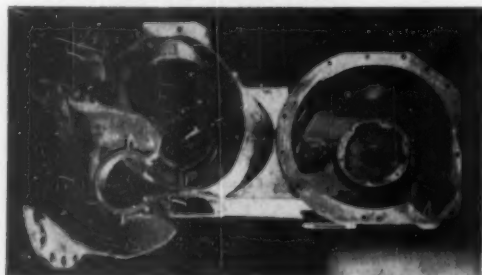
A.C. AND D.C. GENERATORS

Write Today
for Bulletins
600 and 800

COLUMBIA ELECTRIC MFG. CO.

4557 HAMILTON AVE. CLEVELAND 14, OHIO

BEFORE

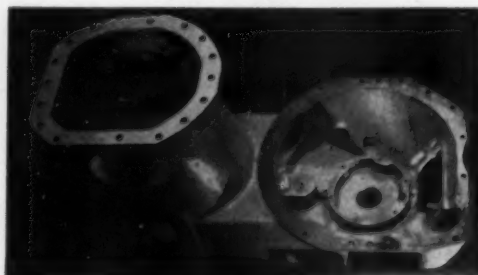


NOT HOPELESSLY DAMAGED!

This grader transmission case broke down completely. A valuable and important piece of equipment was forced out of service as a consequence. A quick decision was needed. To replace or to repair? Guth-Pascoe was consulted and it was decided to repair the part.

The result was a restored casting in "as-new" condition ready for long, heavy-duty service at a fraction of the replacement cost.

AFTER



REPAIRED THE GUTH-PASCOE WAY!!

... at a substantial savings by the GUTH FUSION PROCESS. All ferrous and many non-ferrous castings (aluminum included) can be restored no matter how badly damaged. Size and complexity is no obstacle. Castings are returned to their original manufacturer's specifications.

Whatever the emergency, however badly damaged the part is, it will pay you to investigate Guth-Pascoe. On your next job, give Guth-Pascoe the break!

A Combined Experience of 72 Years in Welding and Rebuilding

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EMERGENCY

rush service day or night... Sundays and Holidays included

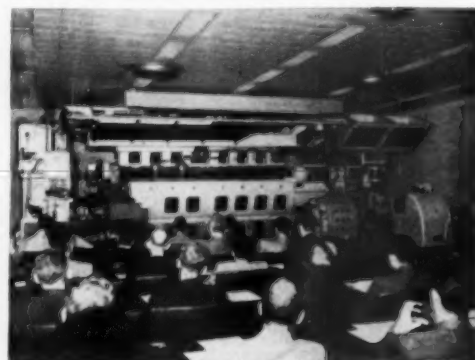
New Fuel Oil Additive



N. T. "Nick" Sauerborn

W. S. Coles, executive vice president of The Shaler Company, Waupun, Wisconsin, announces the appointment of N. T. "Nick" Sauerborn to head up a new department for the introduction of newest Shaler product, their Multi-Purpose Fuel Oil Additive, which, it is reported, controls and reduces corrosion, sludge, and slugging—increasing economy of operation and efficiency in diesel operation. Sauerborn has had pioneering experience in the use of dual-purpose additives for heavy residual fuels and is well known in the industry.

Students of Diesel Engines



N. C. Dezendorf, vice president of General Motors and general manager of Electro-Motive Division welcomes professors of mechanical engineering to a one-day special educational meeting sponsored by the Diesel Engine Manufacturer Association and held recently at Electro-Motive's plant.

Railroads Install 1667 Diesels

In the first nine months of 1953 a total of 1688 locomotive units were placed in service by railroads and of these 1667 were diesel electric.

Diesel Units on Order

New locomotive units on order October 1 of this year totaled 548 and of these 520 units were diesel electric.

66 Diesels for Missouri Pacific

Missouri Pacific Railroad is dieselizing its roads at a fast pace. Next year 74% of its lines will be dieselized—all Gulf Coast lines and International-Great Northern mileage will be completely dieselized. Orders will be placed soon for 66 new units at a cost of \$10,731,000.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition is now off the press. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California.

DIESEL PROGRESS

Appoint Lumley



Charles S. Lumley his engineering education in England followed by post graduate work at Columbia University. He is a Fellow of the AIEE, Charter Member of the Engineering Society of Detroit and a member of the American Society for Testing Materials and the National Society of Professional Engineers.

G.N. Buys 37 New Diesels

Expenditure of \$6,100,000 for 37 new diesel-electric locomotive units and \$14,726,000 for track and bridge improvement in 1954 was authorized by the Great Northern Railway at a recent board of directors meeting in New York. The locomotive units will be of 1500 horsepower each, with 31 units for switching and road duty and six for road use.

Explosion Proof Valves



New two and three way solenoid valves are available from Automatic Switch Company with explosion proof solenoids suitable for Class I Group D hazardous locations. Solenoid enclosures are of cast iron with 1/2 in. threaded conduit connections. Conduit boxes can be revolved

360°. Two way valves are available normally closed for shut-off and normally open for shut-off. Size is compact, 3 in. high and 2-19/38 in. wide. Three way units are suitable for any type of three way application regardless of the direction of flow or points of pressure without change of springs or other adjustments. Size is 3 3/4 in. high and 2-19/32 in. wide. Both operate at 115v or 230v ac, 60 cycles or 115v dc.

Sales Manager Named by Bendix-Scintilla

Donald B. Morse has been appointed as sales manager of the Scintilla division of Bendix Aviation Corporation, according to an announcement by Thomas Z. Fagan, director of sales and service.

Gerald Terpenning succeeds Morse as manager of sales in the western states. Morse joined Scintilla in 1941 as a member of the engineering department. Terpenning, formerly a field engineer, joined Bendix in 1940. Scintilla manufactures aviation and automotive ignition systems, diesel fuel injection equipment and a broad line of electrical components for general industrial use.

DECEMBER, 1953

DIESEL USERS AGREE

that for Completely Dependable Automatic Lubrication, it's

Manzel

FORCE FEED LUBRICATORS



DIVISION OF FRONTIER INDUSTRIES
275 BARCOCK STREET, BUFFALO 10, N. Y.

STOP VIBRATION WITH KORFUND VIBRATION CONTROL

Install Engines Anywhere!

This installation of a heavy 550 HP Baldwin on a truck trailer proves we really mean it when we say "Install Engines Anywhere".

You CAN install engines anywhere (on truck trailers, railroad cars, ships, in hospitals or office and apartment buildings) with positive freedom from objectionable vibration by using Korfund Vibration Control units.

Economical, effective Korfund units stop vibration, and reduce engine and building maintenance costs; reduce noise level; and frequently eliminate the need for special foundations.

For more information, see our page in the "Diesel Engine Catalog", or our catalog in Sweet's Files — or write for your copy of our Bulletin No. 16. A half-century of experience is at your disposal. Representatives in principal cities.



Korfund Vibro-Isolators permit installation of this 550 HP Baldwin diesel engine generator without a special foundation on a truck trailer operated by Rural Cooperative Power Ass'n, Elk River, Minn. Even though the trailer twists and pitches while traveling over rough fields, Korfund units prevent any distortion of the engine generator... a most severe test.



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Whether your diesel engine was designed for replaceable valve seat inserts or not—even though head or block is normally hot welded—you can get longer life from your engine and suffer less costly down-time by installing P-B Screw-in seat inserts.

The P-B seat allows for expansion, exerts no radial pressure, and stress-relieves the valve port area. It locks in place and can't come out. Will not cock, buckle or distort. Valve seats perfectly and will not bounce, flutter, burn, break or stick. The P-B seat is precision installed and can be replaced without going to oversize.

For more information contact the
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HIGH-SPEED DIESEL WORK-BOAT



A new application for modern high speed diesel engines is shown in this photograph of an ex-Royal Canadian Air Force crash boat. Twin gas-line motors of 150 hp. each have been replaced by a single Mack Model 605 diesel.

Alex Wilbee of Victoria, B.C. will use the vessel as a service boat for his shipyard, and expects also to find her valuable for small salvage jobs. Running light, the boat has clocked 15 knots, and a more suitable propeller is expected to raise this to 17 knots, or about 20 statute mph. The 129 hp. of

the motor should provide plenty of power for small towing jobs and salvage operations.

The hull is 58 ft. long by 9 ft. 6 in. beam, double planked mahogany, from designs by Scott-Paine, and was intended for high speed operation in bad weather. No details are available as to performance before the conversion, but one thing is certain; the engines could not have been smoother. So easy is her motion and so quiet the power that Mr. Wilbee expects to use the boat quite extensively for photography of other ships.

Pilot Boat Launched

Another Savannah Bar pilot boat was recently launched at St. Augustine, Fla. by the Diesel Engine Sales Co. and has been put into service by the Savannah, Ga., Bar Pilots Association. Tams designed, the boat is 60 ft. overall and has a beam of 18 ft. The power unit is a D15000 Caterpillar diesel engine with a Twin Disc clutch and Snow Nabstedt 2:1 reduction gears which turns a 42x32 4-blade Columbian propeller.



The engine room also has a 3-kw. Onan Diesel generating set.

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50th Boat Show

The Golden Jubilee Boat Show, celebrating the 50th anniversary of the National Association of Engine and Boat Manufacturers, will be held in the Kingsbridge Armory for nine consecutive days, January 15 through 23, 1954. For the first time the National Show will have first floor space for all exhibitors and be open on Sunday. The majestic colossus of Greater New York, the Kingsbridge Armory, Kingsbridge Road and Jerome Avenue, Bronx, which will house the National Motor Boat Show has the world's largest unobstructed floor area—180,000 sq. ft. for economical and dramatic display for boating industry products. The exhibition field, equal in size to four football fields, is surrounded by a balcony seating 3,000.

German Firm Signs With GM



Following the lines of previous agreements of General Motors with leading locomotive builders of other countries, a West German firm represented by Oscar R. Henschel signs an agreement to make GM diesels. Looking on are N. C. Dezendorf of General Motors, Electro-Motive Division, and Carl Frydag, a director of the firm, Henschel & Sohn.

An agreement for manufacture of diesel locomotives between Henschel & Sohn G.m.b.H. of Kassel, Germany and General Motors provides for collaboration in the design, manufacture and marketing of diesel locomotives to be manufactured by Henschel in their Kassel plant, utilizing designs and manufacturing methods which have been proven successful in the production of locomotives for United States railroads. Local manufacture of important components of the locomotives will be fostered under the agreement.



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DECEMBER, 1953

Steel Shrimp Trawler



The *Ocean Lady* is the last word in steel shrimp trawlers, built by the Bellinger Shipbuilding Co. of Atlantic Beach, Fla. It is a 65x18 Tams designed trawler and owned by Land and Williams of Fernandina Beach. Powered with a 110 GM 275 hp. and has a 4.5:1 GM hydraulic gear; with a 52x42 3 blade propeller her speed is 11 knots. Also equipped with diesel auxiliaries and electronic equipment. The fresh water system is automatic pressure with an electric driven pump. The captain's and crew's quarters are equipped with showers. She is now operating out of Fort Myers, Fla. to the Campeche area. Florida Diesel Engine Sales, G.M.C., Jacksonville, supplied the engines.

Florida News

J. RAY McDERMOTT, Inc., Harvey, Louisiana, has recently put into service its dragline barge *Ralph T. McDermitt*, built by Avondale Marine Ways, also of Harvey, and equipped with spuds for anchoring or moving the barge. The spuds are powered with a 140 hp. General Motors diesel. Dragline is operated by a 550 hp. Cooper-Bessemer.

RECENT Cummins repower jobs were a model HRB 600 in a Mack truck for the Merchant Grocery Co. and a 165 hp. HRB in an Autocar truck for Florida Commercial Trailers; from Cummins Diesel Engines of Florida.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition is now off the press. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California, and get your copy now.

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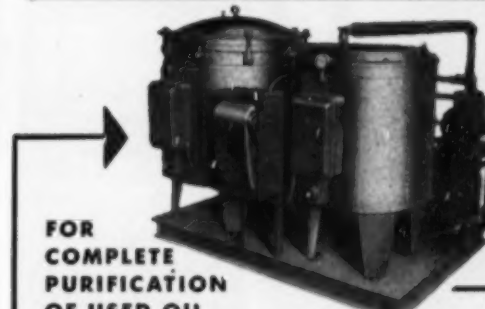
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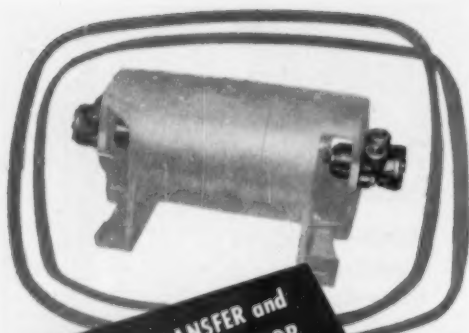
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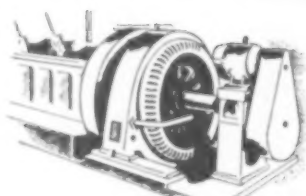
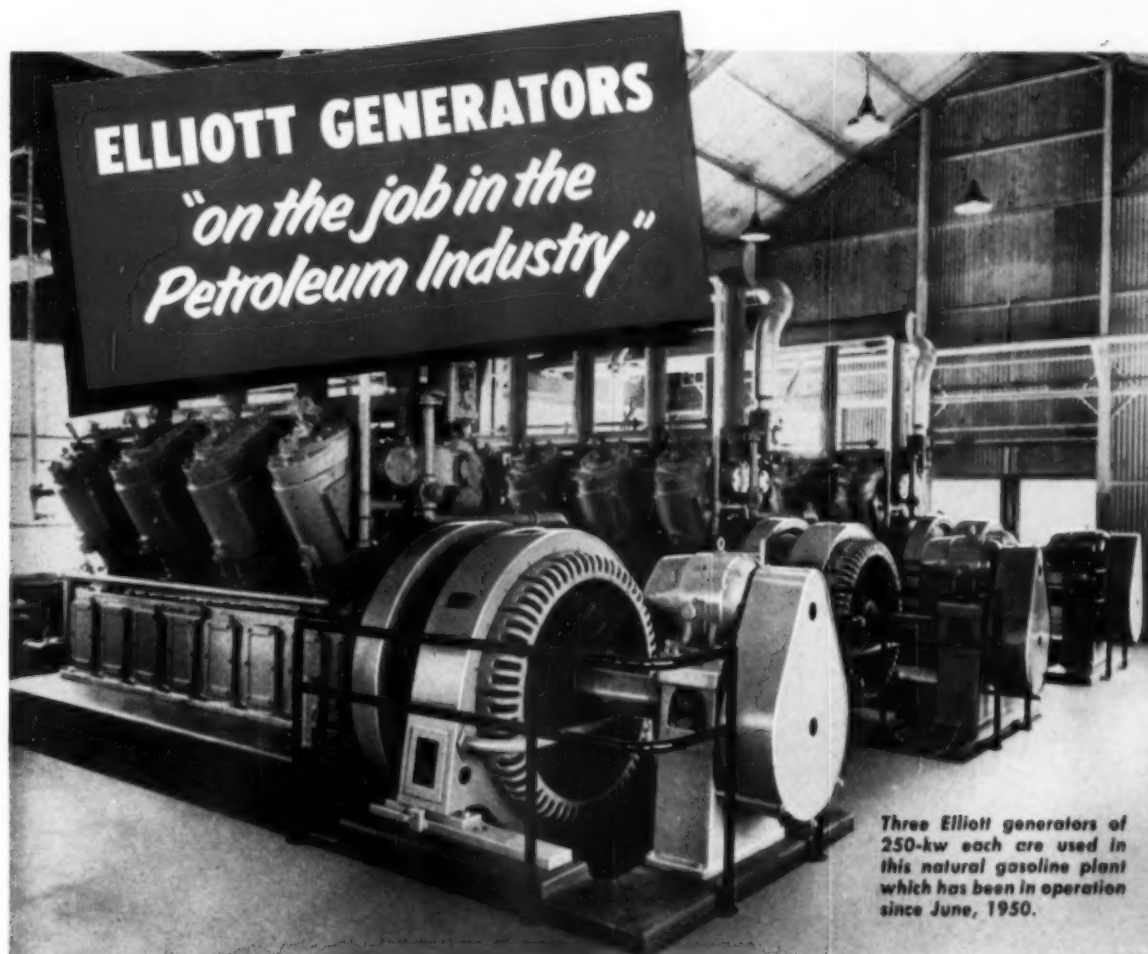
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This very competent-appearing installation supplies all necessary electrical power for pump drives, lighting, and other power needs in this natural gasoline plant in Texas.

The three generators are Elliott units, 250-kw each, driven by Ingersoll-Rand gas engines. In these generators Elliott "Fabri-Steel" construction is used throughout, providing the highest degree of rigidity plus the strength that only steel can give. Note that easy access to the rotor is gained swiftly by removing the bolts in the stator feet and sliding the stator along the extension of the bed, to clear the rotor.

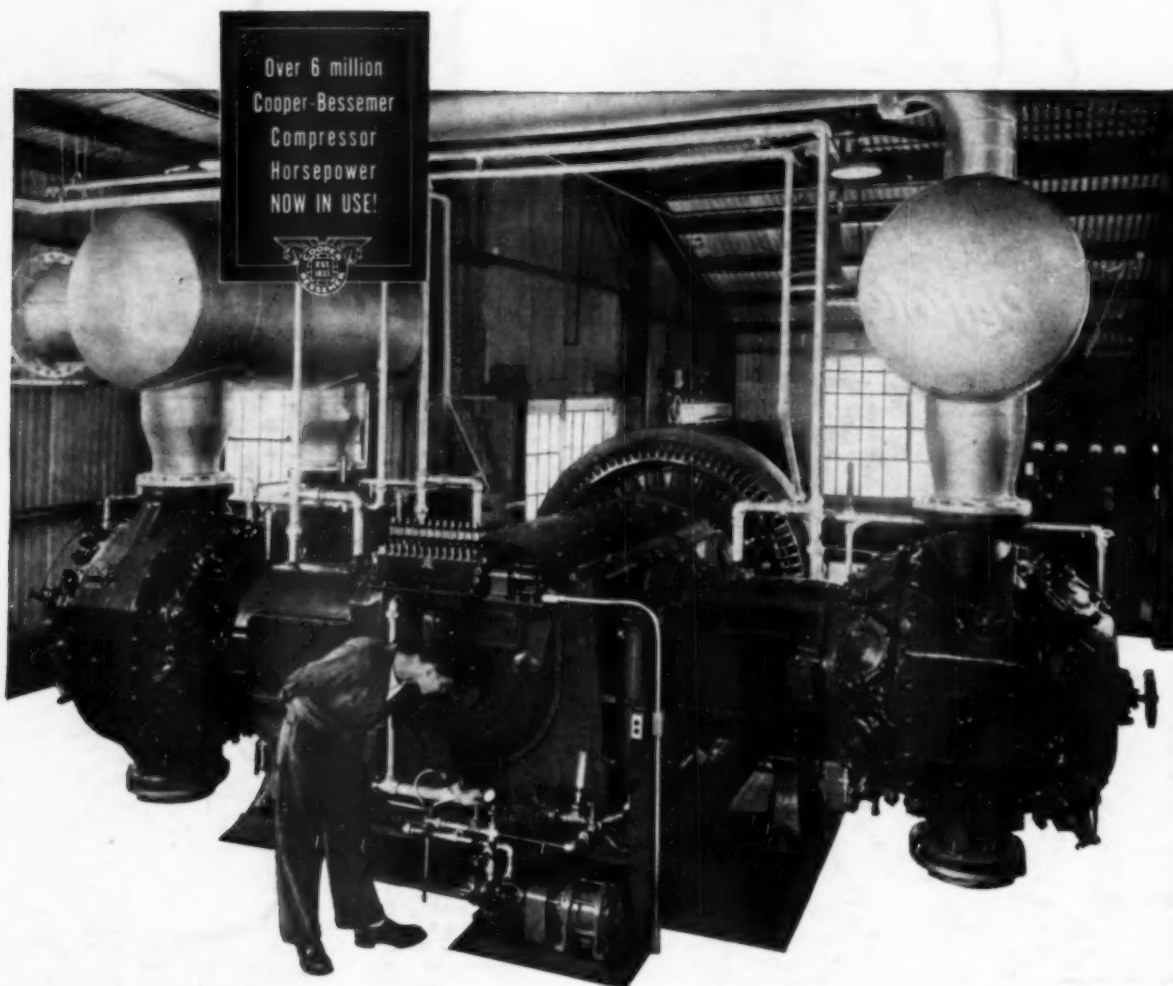
For full data on Elliott generators, consult your local Elliott representative, or write Elliott Company, Ridgway, Pa.



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